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# REPORT

OF THE

# TESTS OF METALS

AND

# OTHER MATERIALS

FOR

# INDUSTRIAL PURPOSES,

MADE WITH THE

## UNITED STATES TESTING MACHINE AT WATERTOWN ARSENAL, MASSACHUSETTS,

DURING THE

## FISCAL YEAR ENDED JUNE 30, 1900.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
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# LETTER

FROM

# THE SECRETARY OF WAR,

TRANSMITTING

## REPORTS OF TESTS OF IRON, ETC., AT WATERTOWN ARSENAL.

---

WAR DEPARTMENT,
*Washington, December 10, 1900.*

SIR: I have the honor to transmit herewith, as required by law, copy of the report of the commanding officer of the Watertown Arsenal of "tests of iron, steel, and other materials for industrial purposes" made at that arsenal during the fiscal year ended June 30, 1900.

Very respectfully,

ELIHU ROOT, *Secretary of War.*

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

---

WATERTOWN ARSENAL,
*Watertown, Mass., September 7, 1900.*

SIR: In compliance with the requirements of law, I have the honor to forward herewith report of tests of metals, etc., made at this arsenal during the fiscal year ending June 30, 1900.

The total number of specimens tested was 3,029, classified as follows:

| | |
|---|---|
| Gun specimens | 433 |
| For Ordnance Department | 1,279 |
| For other Government Departments | 322 |
| Investigative tests | 588 |
| Tests for private parties | 407 |
| Total | 3,029 |

The receipts and expenditures were as follows:

| | |
|---|---|
| Amount appropriated for testing machine and testing work | $10,000.00 |
| Received from private parties during the year | 1,187.70 |
| Total received | 11,187.70 |
| Amount expended for service and labor | 8,991.09 |
| Amount expended for light, power, tools, implements, and materials for test | 2,106.23 |
| Total expended | 11,097.32 |
| Balance on hand | 90.38 |

Tests of material for the Ordnance Department and other branches of the Government has been the usual routine work of the testing laboratory during the past fiscal year.

These tests have been with material representing the different calibers of field, siege, and seacoast guns, together with the tests of metals used in small arms, the parts of carriages, mounts for rapid-fire guns, and projectiles.

Tests for private parties have been made, as heretofore, in accordance with a provision of the law whereby any citizen of the United States can have tests made at this arsenal upon defraying the cost of the same. An enumeration of the parties who availed themselves of these facilities is appended to the report. The results of such tests are not published.

The class of investigative tests has included subjects pertaining to ordnance construction and those of a general engineering character.

In this class may be found tests by means of hydrostatic pressure of sections from the breech ends of .30 caliber rifle barrels. There were two series, the first consisting of 4 barrels of special steel, the second of 24 barrels, made from steel in regular use.

In the latter series there were 6 barrels in a neutral state, and 6 each which had been treated, after machine finishing, by heating and quenching with oil at the bore, from temperatures of 850°, 1,000°, and 1,250° F., respectively. One-half this number of barrels had been subjected to the further treatment of firing 500 rounds rapidly with service cartridges.

Pressures were gradually applied and the expansion of the sections measured over the powder chamber.

The elastic limits of the barrels was in the vicinity of 36,000 to 40,000 pounds per square inch, excepting those which had been quenched from the temperature of 1,250° F., where higher elastic limits prevailed. This highest quenching temperature caused hardness in a marked degree in a number of the barrels, and in one instance a barrel burst under the pressure of 61,120 pounds per square inch.

The elastic limits of the several groups of barrels were about the same, with the exception of the hardened barrels above noted.

The refrigerating effect of the cartridge cases in the fired barrels was indicated by the oxide tints, which showed lower temperature colors over the powder chambers than along the rifled parts of the barrels, the metal acquiring a dark blue-black color at the hottest places.

A final examination of the metal was made by splitting the tested sections apart by a diametrical cut, bringing the metal at the bore into view.

Among the fired barrels, the effects of the powder gases were comparatively slight in front of the powder chamber; faint incipient cracks only were visible by the aid of a hand magnifying glass for each of the neutral barrels and those which had been quenched from 850° and 1,000° F. The barrels quenched from 1,250° F. showed a network of cracks, more pronounced and visible to the eye.

The resistance of jacketed bullets when forced through the bore of .30-caliber pressure barrels was the subject of inquiry. Very marked differences in resistance were found, due to the condition of the surface of the bore and to the amount of the metal of the jacket of the bullet displaced by the lands of the barrel.

There were case-hardening experiments on steels containing different percentages of carbon. The furnace conditions included normal tem-

peratures and intervals of time of exposure in contact with the carburizing material; also prolonged exposures and both normal and prolonged exposures at low furnace temperatures.

The tensile properties showed decided modifications by this process. The elastic limits in the case-hardened bars were not well defined. There was a gradual introduction of permanent sets, whereas in the untreated bars a very rapid rate of elongation characterized the lower carbon steels as the elastic limit was exceeded.

For the most part the elastic limits were raised, however, and excepting the higher carbon steels the tensile strength was also increased. Accompanying these changes was a lowering in the values of the elongation and contraction of area in the case-hardened bars.

The varying percentage of carbon in the transverse section of a case-hardened bar brings about these modifications in properties. The more useful results are confined to the treatment of the lower carbon bars.

These tests were supplementary to some tension tests on receivers of .30-caliber rifles, where a low carbon steel is finished by case-hardening.

A large number of tests were made on steel castings representing metal for 6-pounder and 15-pounder gun mounts, the primary object for which was to ascertain whether the metal possessed the requisite properties for acceptance.

This metal is largely used in place of cast iron, and the tests are of further interest in showing the decided gain in strength attainable over the latter metal.

Steel castings have a fairly well-defined elastic limit, in some cases clearly defined, and this may equal or exceed the tensile strength of some cast irons.

Furthermore, in tensile strength and the display of a limited amount of elongation the ordinary grades of steel castings possess valuable properties. Adaptability for hot working and welding are incidental advantages of importance.

Helical springs used in mortar carriages were examined under different conditions of loading.

The paths described are not coincident under ascending and descending loads, from which it follows that the height under a given load is not fixed, but dependent in a degree upon the previous manner of loading.

Under descending loads the heights are less than under corresponding advancing loads, a condition not modified by prolonged rest under a partial descending load.

Slices from the tubes of 5-inch rapid-fire guns were examined for internal strains, the result of treatment by heating the forgings throughout and then quenching from the bore.

This treatment causes a final state of compression at and near the surface quenched, with the metal in a state of tension in other parts of the forging. The magnitude of the strains thus introduced are controlled by regulating the temperature at the time of quenching. The rapidity of cooling also influences the results by varying the relative temperatures of the different parts of the forging.

Internal strains may be reduced in magnitude or eliminated by annealing at different temperatures.

The results of tests of cast irons from the arsenal foundry are accompanied by a statement of the furnace charges. Different grades of iron have been produced to meet the special requirements of metal

for different classes of projectiles and for the parts of carriages where high tensile strength was needed, and iron which admits of being readily machined.

There have been additional tests of concrete, supplementing earlier tests on this subject.

A number of pieces of white pine and oak wood from the roof trusses of the Old South Church, Boston, Mass., were tested. Taking into account the condition of this timber, with reference to the number and disposition of the knots in the wood, its compressive strength appears to be normal.

These timbers were removed from the church roof during the summer of 1899 and appear to have been a part of the original trusses put in at the time the church was built in 1729, thus making the age of the timber one hundred and seventy years.

The compressive resistance of rubber and balata springs was determined, and observations made on the effects of increase of temperature on these two kinds of gum. It was shown that balata melts and flows at a temperature which may be reached by the atmosphere, rubber being unaffected over similar ranges of temperature.

Balata can be used in a spring with india rubber, the latter retaining the former in the shape of the spring but without modifying the peculiar properties of the balata, the composite spring being a mechanical mixture.

A spring of rubber and balata with about 50 per cent mineral matter in the composition has successfully withstood the action of oils.

The endurance tests of steel bars in the shape of rotating shafts transversely loaded have continued. Fiber stresses have been maintained at 40,000 pounds per square inch.

Two bars of the same chemical composition, 0.26 carbon, but differently treated, the one which was oil tempered and annealed at a high heat endured over 50,000,000 repetitions of load before rupture. The other, a hardened bar, ruptured at 19,578,810 repetitions.

Among the higher carbon bars which are under test, a bar of 0.82 carbon has endured over 104,000,000 repetitions and continued still unruptured.

Many experiments are needed before general deductions on the subject of the endurance of steels to repeated alternate stresses can be undertaken. It is recognized, however, that the endurance of steel can be raised by different methods, both with respect to the number of loadings as well as their magnitude.

The chemical composition, heat treatment, and mechanical treatment all appear to be functions of the endurance of the metal to repeated stresses.

The tensile properties, as ordinarily defined, afford some indication of the ability of the metal in this respect, but a direct relation between the two has not been shown.

Chemical analyses have been made on the different classes of material which have been subjected to mechanical tests.

The new 100,000-pound Emery testing machine for tests by tension and compression each, has been installed and is now in operation.

A line standard bar of 40 inches capacity, graduated by Bond, has been added to the apparatus of the testing laboratory.

This is one of a set of three to be provided, two of which will be in English units and one in metric.

The equipment of the testing laboratory now consists of the original 400-ton Emery testing machine, to which has been added the new 50-ton Emery machine, an impact machine, a cement testing machine, a standard comparator of 100 inches capacity, a microscopic outfit for micrometallography, and a well-equipped chemical laboratory.

The annual appropriation of $10,000 for the testing department was increased to $15,000 at the last session of Congress. This increased appropriation, with the additional testing apparatus recently acquired, will greatly facilitate the ordinary routine testing of the department and enable more work to be done upon the class of investigating tests, having for their object the general investigation of the properties on constructive materials and the advancement of the industrial resources of the country.

Acknowledgment is due of the invaluable services of Mr. J. E. Howard, C. E., who has been engineer of tests since the establishment of the department.

Very respectfully, your obedient servant,

J. W. REILLY,
*Lieut. Col., Ordnance Department, U. S. A., Commanding.*

The CHIEF OF ORDNANCE, U. S. A.,
*Washington, D. C.*

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# TESTS OF METALS AND OTHER MATERIALS

FOR

## INDUSTRIAL PURPOSES,

MADE WITH THE

UNITED STATES TESTING MACHINE AT WATERTOWN ARSENAL, MASSACHUSETTS,

DURING THE

FISCAL YEAR ENDED JUNE 30, 1900.

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# 3-INCH R. F. GUNS.

## SPECIMENS FROM TUBES AND JACKETS.

## TUBE.

## No. 6598.

Marks, $\frac{A-261-3\ T}{B_2}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 40,000 | .00145 | .00045 | ..... | ..... | |
| 44,000 | .00170 | .00025 | ..... | ..... | Elastic limit. |
| 45,000 | .00200 | .00030 | ..... | ..... | |
| 46,000 | .00225 | .00025 | ..... | ..... | |
| 47,000 | .00355 | .00130 | ..... | ..... | |
| 48,000 | .00475 | .00120 | ..... | ..... | |
| 49,000 | .00700 | .00225 | ..... | ..... | |
| 81,050 | ..... | ..... | ..... | ..... | Tensile limit. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 81,050 |
| Elastic limit per square inch of original section | do... | 44,000 |
| Elongation per inch after rupture | inch.. | .2350 |
| Elongation per inch under strain at elastic limit | do... | .00170 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | ".7 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ".11, ".36† |

## TUBE.

## No. 6798.

Marks, $\frac{A\ 337\text{-}3\ T}{B\ 3}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00040 | .00030 | ..... | ..... | |
| 20,000 | .00070 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00030 | ..... | ..... | |
| 35,000 | .00120 | .00020 | 0. | ..... | |
| 40,000 | .00135 | .00015 | ..... | ..... | |
| 42,000 | .00145 | .00010 | 0. | ..... | |
| 47,000 | .00170 | .00025 | ..... | ..... | |
| 49,000 | .00175 | .00005 | ..... | ..... | Elastic limit. |
| 50,000 | .00350 | .00175 | ..... | ..... | |
| 51,000 | .00475 | .00125 | ..... | ..... | |
| 52,000 | .00800 | .00325 | ..... | ..... | |
| 53,000 | .00900 | .00100 | ..... | ..... | |
| 54,000 | .01050 | .00150 | ..... | ..... | |
| 82,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 82,950 |
| Elastic limit per square inch of original section | do... | 49,000 |
| Elongation per inch after rupture | inch.. | .2300 |
| Elongation per inch under strain at elastic limit | do... | .00175 |
| Reduction in diameter at point of rupture | do... | .125 |
| Reduction in area after rupture, per cent of original section | | 43.3 |
| Position of rupture | | ".7 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ".33*,".18 |

## JACKET.

## No. 6599.

Marks, $\frac{A}{B}$ 286-3 J
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00055 | .00025 | ..... | ..... | |
| 30,000 | .00095 | .00040 | ..... | ..... | |
| 40,000 | .00115 | .00020 | ..... | ..... | |
| 50,000 | .00145 | .00030 | ..... | ..... | Elastic limit. |
| 51,000 | .00170 | .00025 | ..... | ..... | |
| 52,000 | .00295 | .00125 | ..... | ..... | |
| 53,000 | .00460 | .00165 | ..... | ..... | |
| 54,000 | .00650 | .00190 | ..... | ..... | |
| 55,000 | .00755 | .00105 | ..... | ..... | |
| 89,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 89,450 |
| Elastic limit per square inch of original section | do... | 50,080 |
| Elongation per inch after rupture | inch.. | .2250 |
| Elongation per inch under strain at elastic limit | do... | .00145 |
| Reduction in diameter at point of rupture | do... | .125 |
| Reduction in area after rupture, per cent of original section | | 48.3 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky |
| Elongation of inch sections | | ".22*, ."23* |

## JACKET.

## No. 6600.

Marks, $\frac{A}{B}$ 291-3 J
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 40,000 | .00135 | .00035 | ..... | ..... | |
| 50,000 | .00170 | .00035 | ..... | ..... | |
| 51,000 | .00175 | .00005 | ..... | ..... | Elastic limit. |
| 52,000 | .00195 | .00020 | ..... | ..... | |
| 53,000 | .00230 | .00035 | ..... | ..... | |
| 54.000 | .00350 | .00120 | ..... | ..... | |
| 55,000 | .00450 | .00100 | ..... | ..... | |
| 56,000 | .00700 | .00250 | ..... | ..... | |
| 86,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 86,950 |
| Elastic limit per square inch of original section | do... | 51,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .00175 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 34.0 |
| Position of rupture | | ".95 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ".13, ".25* |

## JACKET.

## No. 6799.

Marks, $\frac{\text{A-288-3 J}}{\text{B}_2}$
Diameter ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| 30,000 | .00105 | .00035 | ..... | ..... | |
| 40,000 | .00135 | .00030 | 0. | ..... | |
| 46,000 | .00160 | .00025 | 0. | ..... | |
| 60,000 | .00210 | .00050 | ..... | ..... | Elastic limit. |
| 61,000 | .00220 | .00010 | ..... | ..... | |
| 62,000 | .00245 | .00025 | ..... | ..... | |
| 63,000 | .00275 | .00030 | ..... | ..... | |
| 64,000 | .00450 | .00175 | ..... | ..... | |
| 65,000 | .00610 | .00160 | ..... | ..... | |
| 74,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 74,000 |
| Elastic limit per square inch of original section | do... | 60,000 |
| Elongation per inch after rupture | inch.. | .0250 |
| Elongation per inch under strain at elastic limit | do... | .00210 |
| Reduction in diameter at point of rupture | do... | .005 |
| Reduction in area after rupture, per cent of original section | | 1.8 |
| Position of rupture | | ".8 from neck |
| Character of broken surface | | granular, flaky streak at the circumference |
| Elongation of inch sections | | ".02, ".03* |

## JACKET.

## No. 6800.

Marks, $\frac{A\ 277\text{-}3\ J}{M_2}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 40,000 | .00130 | .00030 | 0. | ..... | |
| 46,000 | .00145 | .00015 | 0. | ..... | |
| 60,000 | .00200 | .00055 | ..... | ..... | |
| 61,000 | .00205 | .00005 | ..... | ..... | Elastic limit. |
| 62,000 | .00245 | .00040 | ..... | ..... | |
| 63,000 | .00295 | .00050 | ..... | ..... | |
| 64,000 | .00400 | .00105 | ..... | ..... | |
| 65,000 | .00550 | .00150 | ..... | ..... | |
| 66,000 | .00650 | .00100 | ..... | ..... | |
| 100,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 100,600 |
| Elastic limit per square inch of original section | do... | 61,000 |
| Elongation per inch after rupture | inch.. | .1700 |
| Elongation per inch under strain at elastic limit | do... | .00205 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | ".45 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ".09, ".25* |

## JACKET.

## No. 6801.

Marks, $\frac{A\ 289\text{-}3\ J}{B3}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per square inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 40,000 | .00140 | .00040 | 0. | ..... | |
| 46,000 | .00160 | .00020 | 0. | ..... | |
| 50,000 | .00185 | .00025 | ..... | ..... | Elastic limit. |
| 51,000 | .00240 | .00055 | ..... | ..... | |
| 52,000 | .00310 | .00070 | ..... | ..... | |
| 53,000 | .00400 | .00090 | ..... | ..... | |
| 54,000 | .00450 | .00050 | ..... | ..... | |
| 55,000 | .00550 | .00100 | ..... | ..... | |
| 95,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 95,100 |
| Elastic limit per square inch of original section | do... | 50,000 |
| Elongation per inch after rupture | inch.. | .2400 |
| Elongation per inch under strain at elastic limit | do... | .00185 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | ".95 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ".17, ".31* |

## *TABULATION OF TENSION SPECIMENS FROM 3-INCH R. F. GUNS (STEMS 2" LONG," .505 DIAMETER).*

| No. of test. | Position in gun. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation. | Contraction of area. | Appearance of fracture. | Remarks. |
|---|---|---|---|---|---|---|---|
| | | *Pounds.* | *Pounds.* | *Pr. ct.* | *Pr. ct.* | | |
| 6598 | Tube .... | 44,000 | 81,050 | 23.5 | 46.2 | Silky ..... | Breech end. |
| 6798 | ....do .... | 49,000 | 82,950 | 23.0 | 43.8 | .....do ..... | Do. |
| 6599 | Jacket... | 50,000 | 89,450 | 22.5 | 43.3 | .....do ..... | Do. |
| 6600 | ....do .... | 51,000 | 86,950 | 19.0 | 34.0 | Granular, silky spot at circumference. | Do. |
| 6799 | ....do .... | 60,000 | 74,000 | 2.5 | 1.8 | Granular, flaky streak at circumference. | Do. |
| 6800 | ....do .... | 61,000 | 100,600 | 17.0 | 30.7 | Granular ..... | Muzzle end. |
| 6801 | ....do .... | 50,000 | 95,100 | 24.0 | 46.2 | Silky ..... | Breech end. |

# 3.6-INCH B. L. FIELD MORTARS.

## SPECIMENS FROM BREECHBLOCKS AND OBTURATING SPINDLES.

## Breechblocks.

| Marks. | Diameter. | Sectional area. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation in 2 and 3 inches. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. |
|---|---|---|---|---|---|---|---|---|
| | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Per ct.* | *Per ct.* | | |
| 1 | .564 | .25 | 58,400 | 90,040 | 26.0 | 65.8 | Fine silky, cup shaped | ″.43*, ″.09. |
| 2 | .564 | .25 | 60,400 | 96,000 | 25.0 | 61.5 | .....do..... | ″.38*, ″.12. |
| 4 | .564 | .25 | 62,200 | 88,760 | 24.3 | 49.7 | .....do..... | ″.16, ″.40*, ″.17. |
| 5 | .564 | .25 | 58,080 | 85,200 | 24.0 | 52.2 | .....do..... | ″.18, ″.40*, ″.14. |

## Obturating Spindles.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | .564 | .25 | 74,800 | 104,800 | 23.5 | 59.3 | Fine silky, cup shaped | ″.17, ″.30*. |
| 2 | .564 | .25 | 62,800 | 88,640 | 27.5 | 57.0 | .....do..... | ″.37*, ″.18. |
| 3 | .564 | .25 | 62,480 | 84,400 | 30.0 | 63.7 | .....do..... | ″.40*, ″.20. |
| 4 | .564 | .25 | 66,000 | 94,480 | 27.0 | 67.8 | .....do..... | ″.40*, ″.14. |
| 5 | .564 | .25 | 61,000 | 90,720 | 26.0 | 54.6 | .....do..... | ″.38*, ″.14. |
| 6 | .564 | .25 | 61,640 | 88,720 | 27.0 | 57.0 | .....do..... | ″.19, ″.35*. |
| 7 | .564 | .25 | 67,200 | 98,400 | 25.0 | 61.5 | .....do..... | ″.10, ″.40*. |

# 5-INCH B. L. SIEGE RIFLES.

## SPECIMENS FROM TUBES AND JACKETS.

## TUBE.

## No. 6442

Marks, $\frac{14484\ B_2}{M\ T_2\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauge length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 35,000 | .00115 | .00015 | 0. | ..... | |
| 40,000 | .00130 | .00015 | ..... | ..... | |
| 42,000 | .00140 | .00010 | 0. | ..... | |
| 43,000 | .00145 | .00005 | ..... | ..... | |
| 44,000 | .00150 | .00005 | ..... | ..... | Elastic limit. |
| 45,000 | .00425 | .00275 | ..... | ..... | |
| 46,000 | .00585 | .00160 | ..... | ..... | |
| 47,000 | .00655 | .00070 | ..... | ..... | |
| 48,000 | .00750 | .00095 | ..... | ..... | |
| 49,000 | .00845 | .00095 | ..... | ..... | |
| 87,000 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 87,000 |
| Elastic limit per square inch of original section | do... | 44,000 |
| Elongation per inch after rupture | inch.. | .2300 |
| Elongation per inch under strain at elastic limit | do... | .00150 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.35*, ″.11 |

## TUBE.

## No. 7153.

Marks, $\overset{A\ 13}{5\ T\ M\ 2}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00055 | .00030 | ..... | ..... | |
| 30,000 | .00095 | .00040 | ..... | ..... | |
| 35,000 | .00115 | .00020 | 0. | ..... | |
| 40,000 | .00135 | .00020 | ..... | ..... | |
| 42,000 | .00145 | .00010 | 0. | ..... | |
| 50,000 | .00165 | .00020 | ..... | ..... | |
| 56,000 | .00210 | .00045 | ..... | ..... | Elastic limit. |
| 57,000 | .00250 | .00040 | ..... | ..... | |
| 58,000 | .00300 | .00050 | ..... | ..... | |
| 59,000 | .00350 | .00050 | ..... | ..... | |
| 60,000 | .00435 | .00085 | ..... | ..... | |
| 61,000 | .00550 | .00115 | ..... | ..... | |
| 94,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 94,500 |
| Elastic limit per square inch of original section | do... | 56,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00210 |
| Reduction in diameter at point of rupture | do... | .105 |
| Reduction in area after rupture, per cent of original section | | 87.1 |
| Position of rupture | | ".50 from neck |
| Character of broken surface | | silky, trace of granulation |
| Elongation of inch sections | | ".28*, ".08 |

## JACKET.

## No. 6512.

Marks, $\frac{18169\ B_4}{BT_2\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000367 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | 0. | ..... | |
| 46,000 | .001600 | .000267 | .000033 | .000033 | |
| 50,000 | .001700 | .000100 | ..... | ..... | |
| 51,000 | .001733 | .000033 | ..... | ..... | |
| 52,000 | .001767 | .000034 | ..... | ..... | Elastic limit. |
| 53,000 | .002067 | .000300 | ..... | ..... | |
| 54,000 | .003000 | .000933 | ..... | ..... | |
| 55,000 | .004667 | .001667 | ..... | ..... | |
| 56,000 | .005833 | .001166 | ..... | ..... | |
| 57,000 | .006333 | .000500 | ..... | ..... | |
| 99,040 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 99,040 |
| Elastic limit per square inch of original section | do... | 52,000 |
| Elongation per inch after rupture | inch.. | .1967 |
| Elongation per inch under strain at elastic limit | do... | .001767 |
| Reduction in diameter at point of rupture | do... | .144 |
| Reduction in area after rupture, per cent of original section | | 44.6 |
| Position of rupture | | 1″.21 from neck |
| Character of broken surface | | silky trace of granulation |
| Elongation of inch sections | | ″.21*, ″.27*, ″11 |

## JACKET.

## No. 7154.

Marks, $\frac{A\ 35\text{–}5\ J}{B_1}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | 0. | ..... | |
| 46,000 | .001533 | .000233 | 0. | ..... | |
| 50,000 | .001667 | .000134 | ..... | ..... | |
| 51,000 | .001700 | .000033 | ..... | ..... | Elastic limit. |
| 52,000 | .002000 | .000300 | ..... | ..... | |
| 53,000 | .003000 | .001000 | ..... | ..... | |
| 54,000 | .004000 | .001000 | ..... | ..... | |
| 55,000 | .004667 | .000667 | ..... | ..... | |
| 56,000 | .006000 | .001333 | ..... | ..... | |
| 92,840 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 92,840 |
| Elastic limit per square inch of original section | do... | 51,000 |
| Elongation per inch after rupture | inch.... | .1867 |
| Elongation per inch under strain at elastic limit | do... | .001700 |
| Reduction in diameter at point of rupture | do... | .154 |
| Reduction in area after rupture, per cent of original section | | 47.2 |
| Position of rupture | | 1″.4 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.12, ″.34*, ″.10 |

## JACKET.

## No. 7120.

Marks, $\frac{A\ 20\text{-}5\ J}{B_2}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000200 | .000133 | ..... | ..... | |
| 20,000 | .000583 | .000383 | ..... | ..... | |
| 30,000 | .000867 | .000334 | ..... | ..... | |
| 40,000 | .001200 | .000333 | 0. | ..... | |
| 46,000 | .001467 | .000267 | 0. | ..... | |
| 51,000 | .001667 | .000200 | ..... | ..... | |
| 52,000 | .001700 | .000033 | ..... | ..... | Elastic limit. |
| 53,000 | .002967 | .001267 | ..... | ..... | |
| 54,000 | .005000 | .002033 | ..... | ..... | |
| 55,000 | .006000 | .001000 | ..... | ..... | |
| 56,000 | .007000 | .001000 | ..... | ..... | |
| 57,000 | .007733 | .000733 | ..... | ..... | |
| 93,560 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 93,560 |
| Elastic limit per square inch of original section | do... | 52,000 |
| Elongation per inch after rupture | inch.. | .2133 |
| Elongation per inch under strain at elastic limit | do... | .001700 |
| Reduction in diameter at point of rupture | do... | .154 |
| Reduction in area after rupture, per cent of original section | | 47.2 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky |
| Elongation of inch sections | | ".14, ".89*, ".11 |

*TABULATION OF TENSION SPECIMENS FROM 5-INCH B. L. SIEGE RIFLES (STEMS OF SPECIMENS FROM TUBES 2" LONG, ".505 DIAMETER).*

| No. of test. | Position in gun. | Location of specimens. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation. | Contraction of area. | Appearance of fracture. | Remarks. |
|---|---|---|---|---|---|---|---|---|
| | | | *Pounds.* | *Pounds.* | *Pr. ct.* | *Pr. ct.* | | |
| 6442 | Tube .... | Middle . | 44,000 | 87,000 | 23.0 | 46.2 | Silky..... | Muzzle end. |
| 7153 | ....do .... | ..... | 56,000 | 94,500 | 18.0 | 37.1 | Silky, trace of granulation. | Do. |

*STEMS OF SPECIMENS FROM JACKETS 3" LONG, ".564 DIAMETER.*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 6512 | Jacket... | Middle . | 52,000 | 99,640 | 19.7 | 44.6 | Silky, trace of granulation. | Breech end. |
| 7154 | ....do .... | ..... | 51,000 | 92,840 | 18.7 | 47.2 | Silky..... | Do. |
| 7120 | ....do .... | ..... | 52,000 | 93,560 | 21.8 | 47.2 | .....do..... | Do. |

# 6-INCH R. F. GUNS.

## SPECIMENS FROM TUBE AND JACKET.

## TUBE.

## No. 7179.

Marks, $\frac{6\,R\,F_{M}\,T}{M\,T_{2}\,M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 35,000 | .00115 | .00015 | 0. | ..... | |
| 40,000 | .00135 | .00020 | ..... | ..... | |
| 42,000 | .00145 | .00010 | 0. | ..... | |
| 50,000 | .00170 | .00025 | ..... | ..... | |
| 52,000 | .00180 | .00010 | ..... | ..... | |
| 53,000 | .00185 | .00005 | ..... | ..... | Elastic limit. |
| 54,000 | .00255 | .00070 | ..... | ..... | |
| 55,000 | .00400 | .00145 | ..... | ..... | |
| 56,000 | .00600 | .00200 | ..... | ..... | |
| 57,000 | .00710 | .00110 | ..... | ..... | |
| 58,000 | .00850 | .00140 | ..... | ..... | |
| 91,900 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 91,900 |
| Elastic limit per square inch of original section | do... | 53,000 |
| Elongation per inch after rupture | inch.. | .2650 |
| Elongation per inch under strain at elastic limit | do... | .00185 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | 1".10 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ".19, ".34* |

## JACKET.

## No. 7134.

Marks, $\overset{6\ R\ F_8\ J}{M\ T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000133 | .000133 | 0. | ..... | |
| 10,000 | .000333 | .000200 | ..... | ..... | |
| 20,000 | .000700 | .000367 | ..... | ..... | |
| 30,000 | .001100 | .000400 | ..... | ..... | |
| 40,000 | .001533 | .000433 | .000033 | .000033 | |
| 46,000 | .001700 | .000167 | .000067 | .000034 | |
| 50,000 | .001867 | .000167 | ..... | ..... | |
| 55,000 | .002067 | .000200 | ..... | ..... | |
| 56,000 | .002133 | .000066 | ..... | ..... | Elastic limit. |
| 57,000 | .002233 | .000100 | ..... | ..... | |
| 58,000 | .002333 | .000100 | ..... | ..... | |
| 59,000 | .002500 | .000167 | ..... | ..... | |
| 60,000 | .002800 | .000300 | ..... | ..... | |
| 61,000 | .003067 | .000267 | ..... | ..... | |
| 62,000 | .003833 | .000766 | ..... | ..... | |
| 63,000 | .004833 | .001000 | ..... | ..... | |
| 64,000 | .005900 | .001067 | ..... | ..... | |
| 98,320 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 98,320 |
| Elastic limit per square inch of original section | do... | 56,000 |
| Elongation per inch after rupture | inch.. | .2033 |
| Elongation per inch under strain at elastic limit | do... | .002133 |
| Reduction in diameter at point of rupture | do... | .154 |
| Reduction in area after rupture, per cent of original section | | 47.2 |
| Position of rupture | | 1″.70 from neck |
| Character of broken surface | | silky, trace of granulation |
| Elongation of inch sections | | ″.12, ″.37*, ″.12 |

# 7-INCH B. L. SIEGE MORTARS.

## SPECIMENS FROM STEEL BODIES.

## Body.

## No. 6711.

Marks, $\frac{15362\ B_1\ F_1}{M\ T_2\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | ..... | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000367 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 35,000 | .001200 | .000200 | ..... | ..... | |
| 40,000 | .001367 | .000167 | ..... | ..... | |
| 42,000 | .001467 | .000100 | 0. | ..... | |
| 47,000 | .001667 | .000200 | ..... | ..... | |
| 48,000 | .001733 | .000066 | ..... | ..... | Elastic limit. |
| 49,000 | .005333 | .003600 | ..... | ..... | |
| 50,000 | .009333 | .004000 | ..... | ..... | |
| 51,000 | .010333 | .001000 | ..... | ..... | |
| 52,000 | .011000 | .000667 | ..... | ..... | |
| 53,000 | .011333 | .000333 | ..... | ..... | |
| 90,840 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 90,840 |
| Elastic limit per square inch of original section | do... | 48,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do... | .001733 |
| Reduction in diameter at point of rupture | do... | .114 |
| Reduction in area after rupture, per cent of original section | | 36.4 |
| Position of rupture | | 1″.15 from neck |
| Character of broken surface | | silky, trace of granulation |
| Elongation of inch sections | | ″.13, ″.21*, ″.26* |

## Body.

## No. 6778.

Marks, $\frac{15362\ B_2\ F_1}{BT_2\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000133 | .000133 | 0. | ..... | |
| 10,000 | .000333 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 35,000 | .001200 | .000200 | 0. | ..... | |
| 40,000 | .001400 | .000200 | ..... | ..... | |
| 42,000 | .001467 | .000067 | 0. | ..... | |
| 47,000 | .001633 | .000166 | ..... | ..... | |
| 48,000 | .001667 | .000034 | ..... | ..... | Elastic limit. |
| 49,000 | .001967 | .000800 | ..... | ..... | |
| 50,000 | .003333 | .001366 | ..... | ..... | |
| 51,000 | .004267 | .000934 | ..... | ..... | |
| 52,000 | .005267 | .001000 | ..... | ..... | |
| 53,000 | .006067 | .000800 | ..... | ..... | |
| 94,160 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 94,160 |
| Elastic limit per square inch of original section | do... | 48,000 |
| Elongation per inch after rupture | inch.. | .2067 |
| Elongation per inch under strain at elastic limit | do... | .001667 |
| Reduction in diameter at point of rupture | do... | .144 |
| Reduction in area after rupture, per cent of original section | | 44.6 |
| Position of rupture | | 1.″5 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.16, ″.33*, ″.13 |

## Body.

## No. 6869.

**Marks,** $\frac{7\,M\,R_{11}\,G\,B}{M\,T_2\,O}$
**Diameter,** ″.564.
**Sectional area,** .25 square inch.
**Gauged length,** 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000933 | .000300 | ..... | ..... | |
| 35,000 | .001100 | .000167 | 0. | ..... | |
| 40,000 | .001267 | .000167 | ..... | ..... | |
| 42,000 | .001333 | .000066 | 0. | ..... | |
| 48,000 | .001533 | .000200 | ..... | ..... | |
| 49,000 | .001567 | .000034 | ..... | ..... | |
| 50,000 | .001633 | .000066 | ..... | ..... | Elastic limit. |
| 51,000 | .004000 | .002367 | ..... | ..... | |
| 52,000 | .006500 | .002500 | ..... | ..... | |
| 53,000 | .007000 | .000500 | ..... | ..... | |
| 54,000 | .007333 | .000333 | ..... | ..... | |
| 55,000 | .009167 | .001334 | ..... | ..... | |
| 88,960 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| **Tensile strength,** per square inch of original section | pounds.. | 88,960 |
| **Elastic limit,** per square inch of original section | do... | 50,000 |
| **Elongation** per inch after rupture | inch.. | .2100 |
| **Elongation** per inch under strain at elastic limit | do... | .001633 |
| **Reduction** in diameter at point of rupture | do... | .164 |
| **Reduction** in area after rupture, per cent of original section | | 49.7 |
| **Position of rupture** | | at middle of stem |
| **Character** of broken surface | | silky |
| **Elongation** of inch sections | | ″.12, ″.38*, ″.13 |

## Body.

## No. 6870.

Marks, $\overset{7\,M\,R_{18}\,G\,B}{M\,T_1\,\delta}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | ..... | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 35,000 | .001200 | .000200 | 0. | ..... | |
| 40,000 | .001367 | .000167 | ..... | ..... | |
| 42,000 | .001433 | .000066 | 0. | ..... | |
| 50,000 | .001700 | .000267 | ..... | ..... | |
| 56,000 | .001933 | .000233 | ..... | ..... | |
| 57,000 | .001967 | .000034 | ..... | ..... | Elastic limit. |
| 58,000 | .002933 | .000966 | ..... | ..... | |
| 59,000 | .004500 | .001567 | ..... | ..... | |
| 60,000 | .005833 | .001333 | ..... | ..... | |
| 61,000 | .006500 | .000667 | ..... | ..... | |
| 62,000 | .007667 | .001167 | ..... | ..... | |
| 96,480 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 96,480 |
| Elastic limit per square inch of original section | do... | 57,000 |
| Elongation per inch after rupture | inch.. | .1833 |
| Elongation per inch under strain at elastic limit | do... | .001967 |
| Reduction in diameter at point of rupture | do... | .134 |
| Reduction in area after rupture, per cent of original section | | 41.9 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | silky, 60 per cent of surface interspersed with fine granulation |
| Elongation of inch sections | | ″.11, ″.15, ″.29 |

*TABULATION OF TENSION SPECIMENS FROM STEEL BODIES FOR 7-INCH B. L. SIEGE MORTARS (STEMS 3″ LONG, ″.564 DIAMETER).*

| No. of test. | Position in gun. | Location of specimens. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation. | Contraction of area. | Appearance of fracture. | Remarks. |
|---|---|---|---|---|---|---|---|---|
| | | | *Pounds.* | *Pounds.* | *Pr. ct.* | *Pr. ct.* | | |
| 6711 | Body ... | Middle ... | 48,000 | 90,840 | 20.0 | 36.4 | Silky; trace of granulation. | Muzzle end. |
| 6778 | ....do ... | .....do .... | 48,000 | 94,160 | 20.7 | 44.6 | Silky..... | Breech end. |
| 6869 | ....do ... | Outside... | 50,000 | 88,960 | 21.0 | 49.7 | .....do..... | Muzzle end. |
| 6870 | ....do ... | .....do .... | 57,000 | 96,480 | 18.3 | 41.9 | Silky, 60 per cent of surface interspersed with fine granulation. | Do. |

# 7-INCH B. L. SIEGE HOWITZERS.

## SPECIMENS FROM TUBES AND JACKETS

## TUBE.

## No. 6496.

Marks, $^{7\ H_{2}\ T}_{M\ T_{1}\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00055 | .00030 | ..... | ..... | |
| 30,000 | .00095 | .00040 | ..... | ..... | |
| 35,000 | .00110 | .00015 | 0. | ..... | |
| 40,000 | .00125 | .00015 | ..... | ..... | |
| 42,000 | .00180 | .00005 | .00005 | .00005 | |
| 50,000 | .00160 | .00030 | ..... | ..... | |
| 51,000 | .00165 | .00005 | ..... | ..... | Elastic limit. |
| 52,000 | .00180 | .00015 | ..... | ..... | |
| 53,000 | .00490 | .00310 | ..... | ..... | |
| 54,000 | .00700 | .00210 | ..... | ..... | |
| 55,000 | .00800 | .00100 | ..... | ..... | |
| 56,000 | .00900 | .00100 | ..... | ..... | |
| 88,450 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 88,450 |
| Elastic limit per square inch of original section | do... | 51,000 |
| Elongation per inch after rupture | inch.. | .2350 |
| Elongation per inch under strain at elastic limit | do... | .00165 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.26,* ″.21 |

## TUBE.

## No. 6509.

Marks, $\overset{7\ H_2\ T}{B\ T_3\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00080 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 35,000 | .00110 | .00010 | 0. | ..... | |
| 40,000 | .00130 | .00020 | ..... | ..... | |
| 42,000 | .00140 | .00010 | 0. | ..... | |
| 45,000 | .00150 | .00010 | ..... | ..... | |
| 46,000 | .00155 | .00005 | ..... | ..... | |
| 47,000 | .00160 | .00005 | ..... | ..... | Elastic limit. |
| 48,000 | .00185 | .00025 | ..... | ..... | |
| 49,000 | .00350 | .00165 | ..... | ..... | |
| 50,000 | .00550 | .00200 | ..... | ..... | |
| 51,000 | .00665 | .00115 | ..... | ..... | |
| 52,000 | .00760 | .00095 | ..... | ..... | |
| 86,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 86,950 |
| Elastic limit per square inch of original section | do... | 47,000 |
| Elongation per inch after rupture | inch.. | .2550 |
| Elongation per inch under strain at elastic limit | do... | .00160 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | ″.7 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ″.14, ″.37* |

## TUBE.

## No. 6732.

Marks, $\overset{14904\ B_2}{B\ T_c\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 35,000 | .00125 | .00025 | 0. | ..... | |
| 40,000 | .00145 | .00020 | ..... | ..... | |
| 42,000 | .00150 | .00005 | 0. | ..... | |
| 43,000 | .00155 | .00005 | ..... | ..... | Elastic limit. |
| 44,000 | .00950 | .00795 | ..... | ..... | |
| 45,000 | .01125 | .00175 | ..... | ..... | |
| 46,000 | .01200 | .00075 | ..... | ..... | |
| 47,000 | .01285 | .00085 | ..... | ..... | |
| 48,000 | .01400 | .00115 | ..... | ..... | |
| 81,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 81,600 |
| Elastic limit per square inch of original section | do... | 43,000 |
| Elongation per inch after rupture | inch.. | .3050 |
| Elongation per inch under strain at elastic limit | do... | .00155 |
| Reduction in diameter at point of rupture | do... | 145 |
| Reduction of area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | 1″.2 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.23, ″.38* |

## TUBE.

## No. 7121.

Marks, $\frac{A\ 131\text{-}7\ T}{M_1}$
Diameter, ".504.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 35,000 | .00120 | .00020 | 0. | ..... | |
| 40,000 | .00145 | .00025 | ..... | ..... | |
| 42,000 | .00150 | .00005 | 0. | ..... | |
| 48,000 | .00170 | .00020 | ..... | ..... | Elastic limit. |
| 49,000 | .01200 | .01030 | ..... | ..... | |
| 50,000 | .01250 | .00050 | ..... | ..... | |
| 51,000 | .01300 | .00050 | ..... | ..... | |
| 52,000 | .01575 | .00275 | ..... | ..... | |
| 53,000 | .01675 | .00100 | ..... | ..... | |
| 82,050 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 82,050 |
| Elastic limit per square inch of original section | do... | 48,000 |
| Elongation per inch after rupture | inch.. | .2700 |
| Elongation per inch under strain at elastic limit | do... | .00170 |
| Reduction in diameter at point of rupture | do... | .154 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | ".9 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ".15, ".89 |

## JACKET.

## No. 6501.

Marks, $\frac{14816\ B_2\ F_1}{B\ T_2\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000133 | .000133 | 0. | ..... | |
| 10,000 | .000333 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | 0. | ..... | |
| 46,000 | .001567 | .000234 | 0. | ..... | |
| 47,000 | .001633 | .000066 | ..... | ..... | Elastic limit. |
| 48,000 | .001800 | .000167 | ..... | ..... | |
| 49,000 | .002000 | .000200 | ..... | ..... | |
| 50,000 | .002300 | .000300 | ..... | ..... | |
| 51,000 | .002600 | .000300 | ..... | ..... | |
| 52,000 | .003033 | .000433 | ..... | ..... | |
| 100,720 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 100,720 |
| Elastic limit per square inch of original section | do... | 47,000 |
| Elongation per inch after rupture | inch.. | .1400 |
| Elongation per inch under strain at elastic limit | do... | .001633 |
| Reduction in diameter at point of rupture | do... | .114 |
| Reduction in area after rupture, per cent of original section | | 86.4 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.25*, ″.10, ″.07 |

## JACKET.

## No. 6510.

Marks, $\overset{7}{M}\overset{H_{RE}}{T_1}\overset{J}{O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000133 | .000133 | 0. | ..... | |
| 10,000 | .000300 | .000167 | ..... | ..... | |
| 20,000 | .000667 | .000367 | ..... | ..... | |
| 30,000 | .001033 | .000366 | ..... | ..... | |
| 40,000 | 001300 | .000267 | 0. | ..... | |
| 46,000 | .001533 | .000233 | 0. | ..... | |
| 50,000 | .001733 | .000200 | ..... | ..... | |
| 56,000 | .001967 | .000234 | ..... | ..... | |
| 57,000 | .002000 | .000033 | ..... | ..... | Elastic limit. |
| 58,000 | .002200 | .000200 | ..... | ..... | |
| 59,000 | .002500 | .000300 | ..... | ..... | |
| 60,000 | .003333 | .000833 | ..... | ..... | |
| 61,000 | .004333 | .001000 | ..... | ..... | |
| 62,000 | .005833 | .001500 | ..... | ..... | |
| 98,880 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 98,880 |
| Elastic limit per square inch of original section | do... | 57,000 |
| Elongation per inch after rupture | inch.. | .1767 |
| Elongation per inch under strain at elastic limit | do... | .002000 |
| Reduction in diameter at point of rupture | do... | .154 |
| Reduction in area after rupture, per cent of original section | | 47.2 |
| Position of rupture | | ″.5 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ″.09, ″.12, ″.32 * |

## JACKET.

## No. 6511.

Marks, $\overset{7\ H_{28}\ J}{M\ T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000267 | .000167 | ..... | ..... | |
| 20,000 | .000633 | .000366 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | 0. | ..... | |
| 46,000 | .001500 | .000200 | 0. | ..... | |
| 50,000 | .001667 | .000167 | ..... | ..... | |
| 55,000 | .001833 | .000166 | ..... | ..... | |
| 58,000 | .001967 | .000134 | ..... | ..... | |
| 59,000 | .002000 | .000033 | ..... | ..... | Elastic limit. |
| 60,000 | .004167 | .002167 | ..... | ..... | |
| 61,000 | .006667 | .002500 | ..... | ..... | |
| 62,000 | .008100 | .001433 | ..... | ..... | |
| 63,000 | .008700 | .000600 | ..... | ..... | |
| 64,000 | .009800 | .001100 | ..... | ..... | |
| 97,440 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 97,440 |
| Elastic limit per square inch of original section | do... | 59,000 |
| Elongation per inch after rupture | inch.. | .2300 |
| Elongation per inch under strain at elastic limit | do... | .002000 |
| Reduction in diameter at point of rupture | do... | .164 |
| Reduction in area after rupture, per cent of original section | | 49.7 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ″.15, ″.40*, ″.14 |

## JACKET.

## No. 6722.

Marks, $\frac{14816\ B_2\ F_2}{B\ T_2\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000367 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | 0. | ..... | |
| 46,000 | .001567 | .000234 | 0. | ..... | |
| 50,000 | .001700 | .000133 | ..... | ..... | Elastic limit. |
| 51,000 | .001983 | .000283 | ..... | ..... | |
| 52,000 | .003033 | .001100 | ..... | ..... | |
| 53,000 | .003767 | .000734 | ..... | ..... | |
| 54,000 | .004667 | .000900 | ..... | ..... | |
| 55,000 | .005267 | .000600 | ..... | ..... | |
| 97,600 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 97,600 |
| Elastic limit per square inch of original section | do... | 50,000 |
| Elongation per inch after rupture | inch.. | .0700 |
| Elongation per inch under strain at elastic limit | do... | .001700 |
| Reduction in diameter at point of rupture | do... | .014 |
| Reduction in area after rupture, per cent of original section | | 5.0 |
| Position of rupture | | ″.4 from neck |
| Character of broken surface | | fine granular |
| Elongation of inch sections | | ″.06, ″.07, ″.08* |

## JACKET.

## No. 6790.

Marks, $\frac{14816\ B_3\ F_1}{B\ T_2\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000633 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000034 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001367 | .000367 | 0. | ..... | |
| 46,000 | .001600 | .000233 | 0. | ..... | |
| 47,000 | .001667 | .000067 | ..... | ..... | |
| 48,000 | .001700 | .000033 | ..... | ..... | Elastic limit. |
| 49,000 | .005333 | .003633 | ..... | ..... | |
| 50,000 | .006500 | .001167 | ..... | ..... | |
| 51,000 | .007333 | .000833 | ..... | ..... | |
| 52,000 | .008333 | .001000 | ..... | ..... | |
| 53,000 | .009100 | .000767 | ..... | ..... | |
| 92,360 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 92,360 |
| Elastic limit per square inch of original section | do... | 48,000 |
| Elongation per inch after rupture | inch.. | .1967 |
| Elongation per inch under strain at elastic limit | do... | .001700 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | 1″.6 from neck |
| Character of broken surface | | silky, trace of granulation |
| Elongation of inch sections | | ″.12, ″.33*, ″.14 |

## JACKET.

## No. 7135.

Marks, $\frac{A}{B_1}$ 18-J$_7$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000167 | .000167 | 0. | ..... | |
| 10,000 | .000367 | .000200 | ..... | ..... | |
| 20,000 | .000733 | .000366 | ..... | ..... | |
| 30,000 | .001100 | .000367 | ..... | ..... | |
| 40,000 | .001433 | .000333 | .000033 | .000033 | |
| 46,000 | .001667 | .000234 | .000033 | 0. | |
| 50,000 | .001800 | .000133 | ..... | ..... | |
| 52,000 | .001867 | .000067 | ..... | ..... | |
| 54,000 | .001967 | .000100 | ..... | ..... | |
| 55,000 | .002033 | .000066 | ..... | ..... | Elastic limit. |
| 56,000 | .003033 | .001000 | ..... | ..... | |
| 57,000 | .003933 | .000900 | ..... | ..... | |
| 58,000 | .006467 | .002534 | ..... | ..... | |
| 59,000 | .007167 | .000700 | ..... | ..... | |
| 60,000 | .008400 | .001233 | ..... | ..... | |
| 91,960 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 91,960 |
| Elastic limit per square inch of original section | do... | 55,000 |
| Elongation per inch after rupture | inch.. | .2133 |
| Elongation per inch under strain at elastic limit | do... | .002033 |
| Reduction in diameter at point of rupture | do... | .174 |
| Reduction in area after rupture, per cent of original section | | 52.2 |
| Position of rupture | | ".75 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ".35*, ".16, ".13 |

## *TABULATION OF TENSION SPECIMENS FROM 7-INCH B. L. SIEGE HOWITZERS.*

### STEMS OF SPECIMENS FROM TUBES 3" LONG, ".564 DIAMETER.

| No. of test. | Position in gun. | Location of specimen. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation. | Contraction of area. | Appearance of fracture. | Remarks. |
|---|---|---|---|---|---|---|---|---|
| | | | *Pounds.* | *Pounds.* | *Per ct.* | *Per ct.* | | |
| 6496 | Tubes ... | Middle .. | 51,000 | 88,450 | 23.5 | 51.9 | Silky..... | Muzzle end. |
| 6509 | ....do .... | ....do .... | 47,000 | 86,950 | 25.5 | 51.9 | Fine silky..... | Breech end. |
| 6732 | ....do .... | ....do .... | 43,000 | 81,600 | 30.5 | 49.1 | Silky..... | Do. |
| 7121 | ....do .... | ..... | 48,000 | 82,050 | 27.0 | 51.9 | .....do..... | Muzzle end. |

### STEMS OF SPECIMENS FROM JACKETS 3" LONG, ".564 DIAMETER.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 6501 | Jacket... | Middle .. | 47,000 | 100,720 | 14.0 | 36.4 | Granular, 60 per cent; silky, 40 per cent. | Breech end. |
| 6510 | ....do .... | Outside.. | 57,000 | 98,880 | 17.7 | 47.2 | Fine silky..... | Muzzle end. |
| 6511 | ....do .... | ....do .... | 59,000 | 97,440 | 23.0 | 49.7 | .....do..... | Do. |
| 6722 | ....do .... | Middle .. | 50,000 | 97,600 | 7.0 | 5.0 | Fine granular..... | Breech end. |
| 6790 | ....do .... | ....do .... | 48,000 | 92,360 | 19.7 | 30.7 | Silky, trace of granulation. | Do. |
| 7135 | ....do .... | ..... | 55,000 | 91,960 | 21.3 | 52.2 | Silky..... | Do. |

# 10-INCH STEEL B. L. RIFLES.

## SPECIMENS FROM TUBES AND JACKETS.

## TUBE.

## No. 6777.

Marks, $\frac{15017\ B_1}{B\ T_2 M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001033 | .000366 | ..... | ..... | |
| 35,000 | .001200 | .000167 | 0. | ..... | |
| 40,000 | .001367 | .000167 | ..... | ..... | |
| 42,000 | .001433 | .000066 | 0. | ..... | |
| 45,000 | .001567 | .000134 | ..... | ..... | |
| 46,000 | .001633 | .000066 | ..... | ..... | Elastic limit. |
| 47,000 | .002333 | .000700 | ..... | ..... | |
| 48,000 | .004500 | .002167 | ..... | ..... | |
| 49,000 | .005667 | .001167 | ..... | ..... | |
| 50,000 | .006667 | .001000 | ..... | ..... | |
| 51,000 | .007667 | .001000 | ..... | ..... | |
| 86,160 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 86,160 |
| Elastic limit per square inch of original section | do... | 46,000 |
| Elongation per inch after rupture | inch.. | .2800 |
| Elongation per inch under strain at elastic limit | do... | .001633 |
| Reduction in diameter at point of rupture | do... | .134 |
| Reduction in area after rupture, per cent of original section | | 41.9 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky |
| Elongation of inch sections | | ".15,".38*,".16 |

## TUBE.

## No. 6987.

Marks, $\frac{7855\ B_2}{M\ T_5\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001033 | .000366 | ..... | ..... | |
| 35,000 | .001200 | .000167 | 0. | ..... | |
| 40,000 | .001400 | .000200 | 0. | ..... | |
| 44,000 | .001467 | .000067 | ..... | ..... | |
| 45,000 | .001533 | .000066 | ..... | ..... | Elastic limit. |
| 46,000 | .001933 | .000400 | ..... | ..... | |
| 47,000 | .002500 | .000567 | ..... | ..... | |
| 48,000 | .005333 | .002833 | ..... | ..... | |
| 49,000 | .006333 | .001000 | ..... | ..... | |
| 50,000 | .007000 | .000667 | ..... | ..... | |
| 91,680 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 91,680 |
| Elastic limit per square inch of original section | do... | 45,000 |
| Elongation per inch after rupture | inch.. | .2167 |
| Elongation per inch under strain at elastic limit | do... | .001533 |
| Reduction in diameter at point of rupture | do... | .144 |
| Reduction in area after rupture, per cent of original section | | 44.6 |
| Position of rupture | | 1″.25 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.14, ″.28*, ″.23* |

## JACKET.

## No. 6744.

Marks, $\overset{15046\ B_1\ F_1}{B\ T_2\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000333 | .000266 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 35,000 | .001167 | .000167 | 0. | ..... | |
| 40,000 | .001333 | .000166 | ..... | ..... | |
| 42,000 | .001400 | .000067 | 0. | ..... | |
| 48,000 | .001667 | .000267 | ..... | ..... | Elastic limit. |
| 49,000 | .002667 | .001000 | ..... | ..... | |
| 50,000 | .004033 | .001366 | ..... | ..... | |
| 51,000 | .004700 | .000667 | ..... | ..... | |
| 52,000 | .005500 | .000800 | ..... | ..... | |
| 53,000 | .006067 | .000567 | ..... | ..... | |
| 94,480 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 94,480 |
| Elastic limit per square inch of original section | do.... | 48,000 |
| Elongation per inch after rupture | inch.. | .1767 |
| Elongation per inch under strain at elastic limit | do.... | .001667 |
| Reduction in diameter at point of rupture | do.... | .124 |
| Reduction in area after rupture, per cent of original section | | 89.2 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky 45 per cent, granular 55 per cent |
| Elongation of inch sections | | ".13, ".31*, ".09 |

## JACKET.

## No. 7010.

Marks, $\frac{10605\ B_1}{M\ T_2\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 35,000 | .001167 | .000167 | 0. | ..... | |
| 40,000 | .001333 | .000166 | ..... | ..... | |
| 42,000 | .001400 | .000067 | 0. | ..... | |
| 47,000 | .001567 | .000167 | ..... | ..... | Elastic limit. |
| 48,000 | .001700 | .000133 | ..... | ..... | |
| 49,000 | .003667 | .001967 | ..... | ..... | |
| 50,000 | .005333 | .001666 | ..... | ..... | |
| 51,000 | .006333 | .001000 | ..... | ..... | |
| 52,000 | .007333 | .001000 | ..... | ..... | |
| 91,360 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 91,360 |
| Elastic limit per square inch of original section | do... | 47,000 |
| Elongation per inch after rupture | inch.. | .2283 |
| Elongation per inch under strain at elastic limit | do... | .001567 |
| Reduction in diameter at point of rupture | do... | .154 |
| Reduction in area after rupture, per cent of original section | | 47.2 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.14, ″.89, ″.14 |

## *TABULATION OF TENSION SPECIMENS FROM 10-INCH STEEL B. L. RIFLES (STEMS 3″ LONG, ″.564 DIAMETER).*

| No. of test. | Position in gun. | Location of specimens. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation. | Contraction of area. | Appearance of fracture. | Remarks. |
|---|---|---|---|---|---|---|---|---|
| | | | *Pounds* | *Pounds.* | *Per ct.* | *Per ct.* | | |
| 6777 | Tube .... | Middle . | 46,000 | 86,160 | 23.0 | 41.9 | Silky..... | Breech end. |
| 6967 | ....do .... | ....do ... | 45,000 | 91,680 | 21.7 | 44.6 | .....do..... | Muzzle end. |
| 6744 | Jacket... | ....do ... | 48,000 | 94,480 | 17.7 | 39.2 | Silky, 45 per cent; granular, 55 per cent. | Breech end. |
| 7010 | ....do .... | ....do ... | 47,000 | 91,360 | 22.3 | 47.2 | Silky..... | Muzzle end. |

# 12-INCH STEEL B. L. RIFLES.

## SPECIMENS FROM TUBE AND JACKET.

## TUBE.

## No. 6763.

Marks, $^{12\ R_{ss}\ T}_{M\ T_1\ O}$
Diameter, .″564.
Sectional area .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | ..... | ..... | |
| 10,000 | .000267 | .000200 | ..... | ..... | |
| 20,000 | .000600 | .000333 | ..... | ..... | |
| 30,000 | .000933 | .000333 | ..... | ..... | |
| 35,000 | .001100 | .000167 | ..... | ..... | |
| 40,000 | .001500 | .000400 | .000233 | .000233 | Elastic limit. |
| 41,000 | .002100 | .000600 | ..... | ..... | |
| 42,000 | .003267 | .001167 | ..... | ..... | |
| 43,000 | .003900 | .000633 | ..... | ..... | |
| 44,000 | .005000 | .001100 | ..... | ..... | |
| 45,000 | .007833 | .002833 | ..... | ..... | |
| 88,760 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 88,760 |
| Elastic limit per square inch of original section | do... | 40,000 |
| Elongation per inch after rupture | inch.. | .2333 |
| Elongation per inch under strain at elastic limit | do... | .001500 |
| Reduction in diameter at point of rupture | do... | .134 |
| Reduction in area after rupture, per cent of original section | | 41.9 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | silky, trace of granulation |
| Elongation of inch sections | | ″.18, ″.18, ″34* |

## JACKET.

## No. 6731.

Marks, $\overset{12\ R_{45}\ J}{M\ T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 35,000 | .001133 | .000166 | 0. | ..... | |
| 40,000 | .001300 | .000167 | ..... | ..... | |
| 42,000 | .001367 | .000067 | 0. | ..... | |
| 50,000 | .001667 | .000300 | ..... | ..... | |
| 51,000 | .001700 | .000033 | ..... | ..... | Elastic limit. |
| 52,000 | .004667 | .002967 | ..... | ..... | |
| 53,000 | .006333 | .001666 | ..... | ..... | |
| 54,000 | .008833 | .002500 | ..... | ..... | |
| 55,000 | .009333 | .000500 | ..... | ..... | |
| 56,000 | .010667 | .001334 | ..... | ..... | |
| 88,400 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 88,400 |
| Elastic limit per square inch of original section | do... | 51,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do... | .001700 |
| Reduction in diameter at point of rupture | do... | .174 |
| Reduction in area after rupture, per cent of original section | | 52.2 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | silky, cup shaped |
| Elongation of inch sections | | ″.09, ″.12, ″.39* |

# 12-INCH B. L. RIFLED MORTARS.

## SPECIMENS FROM TUBES AND JACKETS.

## TUBE.

## No. 6576.

Marks, $\frac{14823\ B_3}{B\ T_2\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 35,000 | .001167 | .000167 | 0. | ..... | |
| 40,000 | .001333 | .000166 | ..... | ..... | |
| 42,000 | .001400 | .000067 | 0. | ..... | |
| 46,000 | .001567 | .000167 | ..... | ..... | |
| 47,000 | .001600 | .000033 | ..... | ..... | |
| 48,000 | .001667 | .000067 | ..... | ..... | |
| 49,000 | .001700 | .000033 | ..... | ..... | Elastic limit. |
| 50,000 | .002600 | .000900 | ..... | ..... | |
| 51,000 | .002733 | .000133 | ..... | ..... | |
| 52,000 | .003633 | .000900 | ..... | ..... | |
| 53,000 | .005000 | .001367 | ..... | ..... | |
| 54,000 | .006033 | .001033 | ..... | ..... | |
| 92,480 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 92,480 |
| Elastic limit per square inch of original section | do... | 49,000 |
| Elongation per inch after rupture | inch.. | .1867 |
| Elongation per inch under strain at elastic limit | do... | .001700 |
| Reduction in diameter at point of rupture | do... | .154 |
| Reduction in area after rupture, per cent of original section | | 47.2 |
| Position of rupture | | ″.5 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.35*, ″.11, ″.10 |

## TUBE.

## No. 6613.

Marks, $\overset{12\ M\ R_{94}\ T}{B\ T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000133 | .000066 | ..... | ..... | |
| 20,000 | .000467 | .000334 | ..... | ..... | |
| 30,000 | .000800 | .000333 | ..... | ..... | |
| 35,000 | .001067 | .000267 | 0. | ..... | |
| 40,000 | .001200 | .000133 | 0. | ..... | |
| 50,000 | .001733 | .000533 | ..... | ..... | |
| 51,000 | .001800 | .000067 | ..... | ..... | Elastic limit. |
| 52,000 | .001933 | .000133 | ..... | ..... | |
| 53,000 | .002067 | .000134 | ..... | ..... | |
| 54,000 | .002433 | .000366 | ..... | ..... | |
| 55,000 | .002800 | .000367 | ..... | ..... | |
| 56,000 | .004133 | .001333 | ..... | ..... | |
| 57,000 | .004933 | .000800 | ..... | ..... | |
| 92,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 92,400 |
| Elastic limit per square inch of original section | do... | 51,000 |
| Elongation per inch after rupture | inch.. | .2200 |
| Elongation per inch under strain at elastic limit | do... | .001800 |
| Reduction in diameter at point of rupture | do... | .154 |
| Reduction in area after rupture, per cent of original section | | 47.2 |
| Position of rupture | | 1".5 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ".17, ".38*, ".11 |

TUBE.

No. 6614.

Marks, $\frac{12\ M\ R_{66}\ T}{B\ T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 89,240 |
| Elastic limit per square inch of original section | do... | 48,000 |
| Elongation per inch after rupture | inch.. | .2200 |
| Elongation per inch under strain at elastic limit | do... | .001467 |
| Reduction in diameter at point of rupture | do... | .174 |
| Reduction in area after rupture, per cent of original section | | 52.2 |
| Position of rupture | | 1".1 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ".12, ".20, ".34" |

## TUBE.

## No. 6651.

Marks, $\frac{12\ M\ R_{06}\ T}{M\ T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000800 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000833 | ..... | ..... | |
| 30,000 | .001000 | .000667 | ..... | ..... | |
| 35,000 | .001200 | .000200 | 0. | ..... | |
| 38,000 | .001383 | .000133 | ..... | ..... | |
| 39,000 | .001400 | .000067 | ..... | ..... | Elastic limit. |
| 40,000 | .001800 | .000400 | ..... | ..... | |
| 41,000 | .001900 | .000100 | ..... | ..... | |
| 42,000 | .002083 | .000133 | .000633 | .000633 | |
| 43,000 | .002133 | .000100 | ..... | ..... | |
| 44,000 | .002233 | .000100 | ..... | ..... | |
| 45,000 | .002367 | .000134 | ..... | ..... | |
| 46,000 | .002533 | .000166 | ..... | ..... | |
| 47,000 | .002667 | .000134 | ..... | ..... | |
| 48,000 | .002867 | .000200 | ..... | ..... | |
| 49,000 | .003000 | .000133 | ..... | ..... | |
| 50,000 | .003267 | .000267 | ..... | ..... | |
| 51,000 | .003533 | .000266 | ..... | ..... | |
| 52,000 | .003900 | .000367 | ..... | ..... | |
| 90,520 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 90,520 |
| Elastic limit per square inch of original section | do... | 39,000 |
| Elongation per inch after rupture | inch.. | .2067 |
| Elongation per inch under strain at elastic limit | do... | .001400 |
| Reduction in diameter at point of rupture | do... | .164 |
| Reduction in area after rupture, per cent of original section | do... | 49.7 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.31*, ″.20, ″.11 |

## TUBE.

## No. 6652.

Marks, $\frac{12\,MR_{gr}\,T}{MT_1\,O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001033 | .000366 | ..... | ..... | |
| 35,000 | .001200 | .000167 | 0. | ..... | |
| 40,000 | .001367 | .000167 | 0. | ..... | |
| 45,000 | .001667 | .000300 | ..... | ..... | |
| 49,000 | .001733 | .000066 | ..... | ..... | |
| 50,000 | .001767 | .000034 | ..... | ..... | Elastic limit. |
| 51,000 | .001967 | .000200 | ..... | ..... | |
| 52,000 | .003500 | .001533 | ..... | ..... | |
| 53,000 | .004500 | .001000 | ..... | ..... | |
| 54,000 | .007000 | .002500 | ..... | ..... | |
| 55,000 | .007833 | .000833 | ..... | ..... | |
| 87,680 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength, per square inch of original section | pounds.. | 87,680 |
| Elastic limit, per square inch of original section | do... | 50,000 |
| Elongation per inch after rupture | inch.. | .2033 |
| Elongation per inch under strain at elastic limit | do... | .001767 |
| Reduction in diameter at point of rupture | do... | .164 |
| Reduction in area after rupture, per cent of original section | | 49.7 |
| Position of rupture | | ″.85 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.38*, ″.14, ″.09 |

## TUBE.

## No. 6721.

Marks, $\frac{15119\ B}{M\ T\ 2M}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000800 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 35,000 | .001133 | .000166 | 0. | ..... | |
| 40,000 | .001300 | .000167 | 0. | ..... | |
| 45,000 | .001467 | .000167 | ..... | ..... | |
| 46,000 | .001533 | .000066 | ..... | ..... | |
| 47,000 | .001600 | .000067 | ..... | ..... | |
| 48,000 | .001633 | .000033 | ..... | ..... | |
| 49,000 | .001667 | .000034 | ..... | ..... | Elastic limit. |
| 50,000 | .005500 | .003833 | ..... | ..... | |
| 51,000 | .006000 | .000500 | ..... | ..... | |
| 52,000 | .006333 | .000333 | ..... | ..... | |
| 53,000 | .007833 | .000500 | ..... | ..... | |
| 54,000 | .008500 | .001167 | ..... | ..... | |
| 92,400 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 92,400 |
| Elastic limit per square inch of original section | do... | 49,000 |
| Elongation per inch after rupture | inch.. | .2167 |
| Elongation per inch under strain at elastic limit | do... | .001667 |
| Reduction in diameter at point of rupture | do... | .144 |
| Reduction in area after rupture, per cent of original section | | 44.6 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.12, ″.18, ″.35* |

## TUBE.

## No. 6764.

Marks, $\overset{15010\ B_1}{B\ T_2\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000800 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000867 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 35,000 | .001167 | .000167 | 0. | ..... | |
| 40,000 | .001333 | .000166 | 0. | ..... | |
| 50,000 | .001783 | .000400 | ..... | ..... | Elastic limit. |
| 51,000 | .002283 | .000500 | ..... | ..... | |
| 52,000 | .007833 | .005600 | ..... | ..... | |
| 53,000 | .008500 | .000667 | ..... | ..... | |
| 54,000 | .009400 | .000900 | ..... | ..... | |
| 55,000 | .010333 | .000933 | ..... | ..... | |
| 88,320 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 88,320 |
| Elastic limit per square inch of original section | do... | 50,000 |
| Elongation per inch after rupture | inch.. | .2467 |
| Elongation per inch under strain at elastic limit | do... | .001783 |
| Reduction in diameter at point of rupture | do... | .164 |
| Reduction in area after rupture, per cent of original section | | 49.7 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky |
| Elongation of inch sections | | ".18, ".42*, ".14 |

## Tube.

### No. 6845.

Marks, $\frac{15019\ B_2}{B\ T_2\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 98,160 |
| Elastic limit per square inch of original section | do... | 52,000 |
| Elongation per inch after rupture | inch.. | .1767 |
| Elongation per inch under strain at elastic limit | do... | .001767 |
| Reduction in diameter at point of rupture | do... | .115 |
| Reduction in area after rupture, per cent of original section | | 36.4 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | granular 60 per cent, silky center 40 per cent |
| Elongation of inch sections | | ″.10, ″.15, ″.28* |

## TUBE.

## No. 7148.

Marks, $\overset{15767\ B_2}{B\ T_1\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000133 | .000133 | 0. | ..... | |
| 10,000 | .000333 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000300 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 35,000 | .001167 | .000167 | 0. | ..... | |
| 40,000 | .001333 | .000166 | 0. | ..... | |
| 43,000 | .001467 | .000134 | ..... | ..... | |
| 44,000 | .001533 | .000066 | ..... | ..... | Elastic limit. |
| 45,000 | .005067 | .003534 | ..... | ..... | |
| 46,000 | .005733 | .000666 | ..... | ..... | |
| 47,000 | .006667 | .000934 | ..... | ..... | |
| 48,000 | .007667 | .001000 | ..... | ..... | |
| 49,000 | .008600 | .000933 | ..... | ..... | |
| 85,920 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 85,920 |
| Elastic limit per square inch of original section | do... | 44,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do... | .001533 |
| Reduction in diameter at point of rupture | do... | .094 |
| Reduction in area after rupture, per cent of original section | | 30.6 |
| Position of rupture | | at middle of the stem |
| Character of broken surface... granular, with a streak of silky metal extending partly across surface | | |
| Elongation of inch sections | | ".14, ".32*, ".14 |

JACKET.

No. 6615.

Marks, $\frac{12\,M\,R_{no}\,J}{B\,T_1\,O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 86,720 |
| Elastic limit per square inch of original section | do.... | 48,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do.... | .001533 |
| Reduction in diameter at point of rupture | do.... | .174 |
| Reduction in area after rupture, per cent of original section | | 52.2 |
| Position of rupture | | ".85 from neck |
| Character of broken surface | | fine silky, oblique |
| Elongation of inch sections | | ".11, ".13, ".39" |

## JACKET.

## No. 6628.

Marks, $\overset{12\ M\ R_{ss}\ J}{M\ T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | ..... | ..... | |
| 10,000 | .000267 | .000200 | ..... | ..... | |
| 20,000 | .000600 | .000333 | ..... | ..... | |
| 30,000 | .000933 | .000333 | ..... | ..... | |
| 35,000 | .001100 | .000167 | 0. | ..... | |
| 40,000 | .001300 | .000200 | ..... | ..... | |
| 42,000 | .001367 | .000067 | ..... | ..... | |
| 50,000 | .001667 | .000300 | ..... | ..... | |
| 51,000 | .001700 | .000033 | ..... | ..... | Elastic limit. |
| 52,000 | .002667 | .000967 | ..... | ..... | |
| 53,000 | .003333 | .001166 | ..... | ..... | |
| 54,000 | .005667 | .001834 | ..... | ..... | |
| 55,000 | .006333 | .000666 | ..... | ..... | |
| 56,000 | .009000 | .001667 | ..... | ..... | |
| 90,040 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 90,040 |
| Elastic limit per square inch of original section | do... | 51,000 |
| Elongation per inch after rupture | inch.. | .1983 |
| Elongation per inch under strain at elastic limit | do... | .001700 |
| Reduction in diameter at point of rupture | do... | .144 |
| Reduction in area after rupture, per cent of original section | | 44.6 |
| Position of rupture | | ".8 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ".11, ".15, ".32* |

## JACKET.

## No. 6629.

Marks, $\frac{14231\ B_1}{B\ T_4\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | ..... | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000367 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 35,000 | .001200 | .000200 | 0. | ..... | |
| 40,000 | .001400 | .000200 | 0. | ..... | |
| 42,000 | .001467 | .000067 | 0. | ..... | |
| 46,000 | .001667 | .000200 | ..... | ..... | |
| 47,000 | .001700 | .000033 | ..... | ..... | Elastic limit. |
| 48,000 | .002000 | .000300 | ..... | ..... | |
| 49,000 | .004333 | .002333 | ..... | ..... | |
| 50,000 | .007167 | .002834 | ..... | ..... | |
| 51,000 | .007667 | .000500 | ..... | ..... | |
| 52,000 | .008433 | .000766 | ..... | ..... | |
| 92,080 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 92,080 |
| Elastic limit per square inch of original section | do... | 47,000 |
| Elongation per inch after rupture | inch.. | .2233 |
| Elongation per inch under strain at elastic limit | do... | .001700 |
| Reduction in diameter at point of rupture | do... | .144 |
| Reduction in area after rupture, per cent of original section | | 44.6 |
| Position of rupture | | ″1.5 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.19, ″.36*, ″.12 |

## JACKET.

## No. 6709.

Marks, $\overset{12\ MR_{88}\ J}{M\ T_1\ 6}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 35,000 | .001100 | .000133 | ..... | ..... | |
| 40,000 | .001300 | .000200 | ..... | ..... | |
| 42,000 | .001367 | .000067 | ..... | ..... | |
| 50,000 | .001633 | .000266 | 0. | ..... | |
| 55,000 | .001800 | .000167 | ..... | ..... | Elastic limit. |
| 56,000 | .002000 | .000200 | ..... | ..... | |
| 57,000 | .003167 | .001167 | ..... | ..... | |
| 58,000 | .005333 | .002166 | ..... | ..... | |
| 59,000 | .006433 | .001100 | ..... | ..... | |
| 60,000 | .007500 | .001067 | ..... | ..... | |
| 95,240 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 95,240 |
| Elastic limit per square inch of original section | do... | 55,000 |
| Elongation per inch after rupture | inch.. | .1967 |
| Elongation per inch under strain at elastic limit | do... | .001800 |
| Reduction in diameter at point of rupture | do... | .164 |
| Reduction in area after rupture, per cent of original section | | 49.7 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.34*, ″.16, ″.09 |

## JACKET.

## No. 6710.

Marks, $\frac{12\ M\ R_{m}\ J}{M\ T_{1}\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000[illegible] | .000100 | ..... | ..... | |
| 10,000 | .000[illegible] | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 35,000 | .001167 | .000167 | 0. | ..... | |
| 40,000 | .001333 | .000166 | ..... | ..... | |
| 42,000 | .001400 | .000067 | ..... | ..... | |
| 52,000 | .001767 | .000367 | ..... | ..... | |
| 53,000 | .001833 | .000066 | ..... | ..... | Elastic limit. |
| 54,000 | .002000 | .000167 | ..... | ..... | |
| 55,000 | .005833 | .003833 | ..... | ..... | |
| 56,000 | .007333 | .001500 | ..... | ..... | |
| 57,000 | .008000 | .000667 | ..... | ..... | |
| 58,000 | .009333 | .001333 | ..... | ..... | |
| 90,800 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 90,800 |
| Elastic limit per square inch of original section | do... | 53,000 |
| Elongation per inch after rupture | inch.. | .2283 |
| Elongation per inch under strain at elastic limit | do... | .001833 |
| Reduction in diameter at point of rupture | do... | .154 |
| Reduction in area after rupture, per cent of original section | | 47.2 |
| Position of rupture | | 1".6 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ".15, ".39*, ".13 |

## JACKET.

## No. 6756.

Marks, $\overset{15117\ B_1}{B\ T_2\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 35,000 | .001200 | .000200 | 0. | ..... | |
| 40,000 | .001367 | .000167 | ..... | ..... | |
| 42,000 | .001433 | .000066 | 0. | ..... | |
| 48,000 | .001633 | .000200 | ..... | ..... | Elastic limit. |
| 49,000 | .001800 | .000167 | ..... | ..... | |
| 50,000 | .001933 | .000133 | ..... | ..... | |
| 51,000 | .003333 | .001400 | ..... | ..... | |
| 52,000 | .004500 | .001167 | ..... | ..... | |
| 53,000 | .005067 | .000567 | ..... | ..... | |
| 96,240 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 96,240 |
| Elastic limit per square inch of original section | do... | 48,000 |
| Elongation per inch after rupture | inch.. | .2267 |
| Elongation per inch under strain at elastic limit | do... | .001633 |
| Reduction in diameter at point of rupture | do... | .184 |
| Reduction in area after rupture, per cent of original section | | 41.9 |
| Position of rupture | | 1″.6 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.16, ″.36*, ″.16 |

## JACKET.

## No. 6935.

**Marks,** $\overset{15115\ B_2}{B\ T_8\ M}$
**Diameter,** ″.564.
**Sectional area,** .25 square inch.
**Gauged length,** 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 35,000 | .001200 | .000200 | 0. | ..... | |
| 40,000 | .001400 | .000200 | ..... | ..... | |
| 42,000 | .001467 | .000067 | 0. | ..... | |
| 48,000 | .001667 | .000200 | ..... | ..... | Elastic limit. |
| 49,000 | .001767 | .000100 | ..... | ..... | |
| 50,000 | .004333 | .002566 | ..... | ..... | |
| 51,000 | .005033 | .000700 | ..... | ..... | |
| 52,000 | .006067 | .001034 | ..... | ..... | |
| 53,000 | .006833 | .000766 | ..... | ..... | |
| 92,720 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 92,720 |
| Elastic limit per square inch of original section | do... | 48,000 |
| Elongation per inch after rupture | inch.. | .1933 |
| Elongation per inch under strain at elastic limit | do... | .001667 |
| Reduction in diameter at point of rupture | do... | .144 |
| Reduction in area after rupture, per cent of original section | | 44.6 |
| Position of rupture | | 1″.3 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.17, ″.28*, ″.13 |

JACKET.

No. 6936.

Marks, $\frac{15872\ B_1}{M\ T_1\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pound.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 35,000 | .001200 | .000200 | II. | ..... | |
| 40,000 | .001367 | .000167 | ..... | ..... | |
| 42,000 | .001423 | .000056 | II. | ..... | |
| 48,000 | .001633 | .000200 | ..... | ..... | Elastic limit. |
| 49,000 | .001800 | .000167 | ..... | ..... | |
| 50,000 | .003000 | .001200 | ..... | ..... | |
| 51,000 | .003400 | [illegible] | ..... | ..... | |
| 52,000 | .004333 | [illegible] | ..... | ..... | |
| 58,000 | .005000 | [illegible] | ..... | ..... | |
| 98,720 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 98,720 |
| Elastic limit per square inch of original section | do... | 48,000 |
| Elongation per inch after rupture | inch.. | .1967 |
| Elongation per inch under strain at elastic limit | do... | .001633 |
| Reduction in diameter at point of rupture | do... | .134 |
| Reduction in area after rupture, per cent of original section | | 41.9 |
| Position of rupture | | 1".43 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ".20, ".29*, ".19 |

## *TABULATION OF TENSION SPECIMENS FROM 12-INCH B. L. RIFLED MORTARS (STEMS 3" LONG, ".564 DIAMETER).*

| No. of test. | Position in gun. | Location of specimens. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation. | Contraction of area. | | |
|---|---|---|---|---|---|---|---|---|
| | | | *Lbs.* | *Lbs.* | *Per ct.* | *Per ct.* | | |
| 6576 | Tube .... | Middle .. | 49,000 | 92,480 | 18.7 | 47.2 | Silky..... | Breech end. |
| 6613 | ....do .... | Outside.. | 51,000 | 92,400 | 22.0 | 47.2 | .....do..... | Do. |
| 6614 | ....do .... | ....do .... | 48,000 | 89,240 | 22.0 | 52.2 | .....do..... | Do. |
| 6651 | ....do .... | ....do .... | 39,000 | 90,520 | 20.7 | 49.7 | .....do..... | Muzzle end. |
| 6652 | ....do .... | ....do .... | 50,000 | 87,680 | 20.3 | 49.7 | .....do..... | Do. |
| 6721 | ....do .... | Middle .. | 49,000 | 92,400 | 21.7 | 44.6 | .....do..... | Do. |
| 6764 | ....do .... | ....do .... | 50,000 | 88,520 | 24.7 | 49.7 | .....do..... | Breech end. |
| 6945 | ....do .... | ....do .... | 52,000 | 98,160 | 17.7 | 38.4 | Granular 60 per cent, silky center, 40 per cent. | Do. |
| 7148 | ....do .... | ....do .... | 44,000 | 85,920 | 20.0 | 30.6 | Granular with a streak of silky metal extending partly across surface. | Do. |
| 6615 | Jacket... | Outside.. | 48,000 | 86,720 | 20.0 | 52.2 | Fine silky, oblique | Do. |
| 6628 | ....do .... | ....do .... | 51,000 | 90,040 | 19.3 | 44.6 | Silky ..... | Muzzle end. |
| 6629 | ....do .... | Middle .. | 47,000 | 92,080 | 22.3 | 44.6 | .....do..... | Breech end. |
| 6709 | ....do .... | Outside.. | 50,000 | 95,240 | 19.7 | 49.7 | .....do..... | Muzzle end. |
| 6710 | ....do .... | ....do .... | 50,000 | 90,800 | 22.3 | 47.2 | .....do..... | Do. |
| 6756 | ....do .... | Middle .. | 53,000 | 98,240 | 22.7 | 41.9 | .....do..... | Breech end. |
| 6885 | ....do .... | ....do .... | 49,000 | 92,720 | 19.3 | 44.6 | .....do..... | Do. |
| 6886 | ....do .... | ....do .... | 49,000 | 95,720 | 19.7 | 41.9 | .....do..... | Muzzle end. |

# RIFLE-BARREL STEEL. .30 CALIBER.

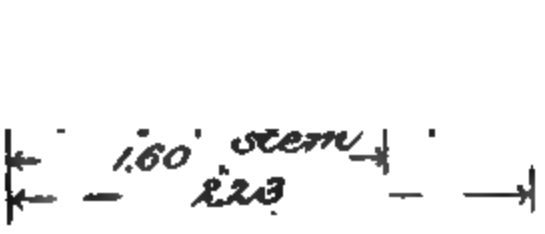
.30 caliber rifle barrels.

Specimens from butt ends.
Sectional area .25 sq. inch.
Special specimen.

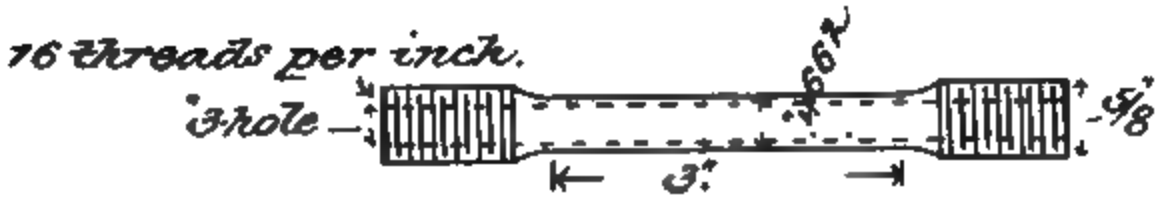
Diameters.
Bore. Exterior.

55
98
08

5




Specimens from middle of lengths,
and muzzle ends.
Sectional area .10 sq. inch.



No. 6493.

Marks, S 6.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002033 | .000366 | ..... | ..... | |
| 70,000 | .002367 | .000334 | ..... | ..... | |
| 71,000 | .002400 | .000033 | ..... | ..... | Elastic limit. |
| 72,000 | .007433 | .005033 | ..... | ..... | |
| 73,000 | .008167 | .000734 | ..... | ..... | |
| 74,000 | .008800 | .000633 | ..... | ..... | |
| 75,000 | .009233 | .000433 | ..... | ..... | |
| 76,000 | .009733 | .000500 | ..... | ..... | |
| 78,000 | .011000 | .001267 | ..... | ..... | |
| 80,000 | .012400 | .001400 | ..... | ..... | |
| 84,000 | .015067 | .002667 | ..... | ..... | |
| 88,000 | .018000 | .002933 | ..... | ..... | |
| 92,000 | .021333 | .003333 | ..... | ..... | |
| 96,000 | .024500 | .003167 | ..... | ..... | |
| 100,000 | .028333 | .003833 | ..... | ..... | |
| 104,000 | .032667 | .004334 | ..... | ..... | |
| 108,000 | .037000 | .004333 | ..... | ..... | |
| 112,000 | .044667 | .007667 | ..... | ..... | |
| 116,000 | .054333 | .009666 | ..... | ..... | |
| 122,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 122,400 |
| Elastic limit per square inch of original section | do... | 71,000 |
| Elongation per inch after rupture | inch.. | .1667 |
| Elongation per inch under strain at elastic limit | do... | .002400 |
| Reduction in diameter at point of rupture | do... | .125 |
| Reduction in area after rupture, per cent of original section | | 43.3 |
| Position of rupture | | 1".4 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".11, ".27*, ".12 |

## No. 6494.

**Marks, S 6.**
**Diameter, ".505.**
**Sectional area, .20 square inch.**
**Gauged length, 3".**

| Applied loads per square inch. | Elonga per in | | | | |
|---|---|---|---|---|---|
| *Pounds.* | *Inch* | | | | |
| 1,000 | 0. | | | | |
| 5,000 | .0001 | | | | |
| 10,000 | .0003 | | | | |
| 20,000 | .0006 | | | | |
| 30,000 | .0010 | | | | |
| 40,000 | .0013 | | | | |
| 50,000 | .0017 | | | | |
| 60,000 | .0020 | | | | |
| 68,000 | .0023 | | | | |
| 69,000 | | | | | |
| 70,000 | | | | | |
| 71,000 | | | | | |
| 72,000 | | | | | |
| 73,000 | | [illegible] | ..... | ..... | |
| 74,000 | | .000867 | ..... | ..... | |
| 76,000 | | .001300 | ..... | ..... | |
| 78,000 | | .001300 | ..... | ..... | |
| 80,000 | .010000 | .001667 | ..... | ..... | |
| 84,000 | .018667 | .003000 | ..... | ..... | |
| 88,000 | .021983 | .003366 | ..... | ..... | |
| 92,000 | .025500 | .003567 | ..... | ..... | |
| 96,000 | .029833 | .003833 | ..... | ..... | |
| 100,000 | .034333 | .005000 | ..... | ..... | |
| 104,000 | .040000 | .005667 | ..... | ..... | |
| 108,000 | .047000 | .007000 | ..... | ..... | |
| 112,000 | .058667 | .011667 | ..... | ..... | |
| 118,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| **Tensile strength per square inch of original section** | **pounds..** | **118,900** |
| **Elastic limit per square inch of original section** | **do...** | **69,000** |
| **Elongation per inch after rupture** | **inch..** | **.1900** |
| **Elongation per inch under strain at elastic limit** | **do...** | **.002367** |
| **Reduction in diameter at point of rupture** | **do...** | **.145** |
| **Reduction in area after rupture, per cent of original section** | | **49.1** |
| **Position of rupture** | | **at middle of stem** |
| **Character of broken surface** | | **fine silky, cup shaped** |
| **Elongation of inch sections** | | **", .12, ". 33*, ". 12** |

No. 6498.

Marks, S 6 . .
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000133 | .000133 | 0. | ..... | |
| 10,000 | .000333 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002067 | .000400 | ..... | ..... | |
| 68,000 | .002400 | .000333 | ..... | ..... | |
| 69,000 | .002433 | .000033 | ..... | ..... | Elastic limit. |
| 70,000 | .010333 | .007900 | ..... | ..... | |
| 71,000 | .010600 | .000267 | ..... | ..... | |
| 72,000 | .011033 | .000433 | ..... | ..... | |
| 73,000 | .011500 | .000467 | ..... | ..... | |
| 74,000 | .012233 | .000733 | ..... | ..... | |
| 76,000 | .013333 | .001100 | ..... | ..... | |
| 78,000 | .014500 | .001167 | ..... | ..... | |
| 80,000 | .016600 | .002100 | ..... | ..... | |
| 84,000 | .019000 | .002400 | ..... | ..... | |
| 88,000 | .022500 | .003500 | ..... | ..... | |
| 92,000 | .026333 | .003833 | ..... | ..... | |
| 96,000 | .030000 | .003667 | ..... | ..... | |
| 100,000 | .035167 | .005167 | ..... | ..... | |
| 104,000 | .041000 | .005833 | ..... | ..... | |
| 108,000 | .049500 | .008500 | ..... | ..... | |
| 112,000 | .060000 | .010500 | ..... | ..... | |
| 119,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 119,000 |
| Elastic limit per square inch of original section | do... | 69,000 |
| Elongation per inch after rupture | inch.. | .1967 |
| Elongation per inch under strain at elastic limit | do... | .002433 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1". 6 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ". 12, ". 35*, ". 12 |

## No. 6499.

From rolled barrel, without reheating.
Marks, S 6 . . . .
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000800 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 64,000 | .002200 | .000200 | ..... | ..... | |
| 65,000 | .002233 | .000033 | ..... | ..... | Elastic limit. |
| 66,000 | .003333 | .001600 | ..... | ..... | |
| 67,000 | .008767 | .004934 | ..... | ..... | |
| 68,000 | .009500 | .000733 | ..... | ..... | |
| 69,000 | .009900 | .000400 | ..... | ..... | |
| 70,000 | .010333 | .000433 | ..... | ..... | |
| 72,000 | .011333 | .001000 | ..... | ..... | |
| 74,000 | .013000 | .001667 | ..... | ..... | |
| 76,000 | .014067 | .001067 | ..... | ..... | |
| 78,000 | .015667 | .001600 | ..... | ..... | |
| 80,000 | .017333 | .001666 | ..... | ..... | |
| 84,000 | .020833 | .003500 | ..... | ..... | |
| 88,000 | .023833 | .003000 | ..... | ..... | |
| 92,000 | .027833 | .004000 | ..... | ..... | |
| 96,000 | .033000 | .005167 | ..... | ..... | |
| 100,000 | .037833 | .004833 | ..... | ..... | |
| 104,000 | .043333 | .005500 | ..... | ..... | |
| 108,000 | .052333 | .009000 | ..... | ..... | |
| 112,000 | .065000 | .012667 | ..... | ..... | |
| 116,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 116,100 |
| Elastic limit per square inch of original section | do... | 65,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .002233 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | ".9 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".09, ".13, ".32* |

No. 6500.

From balance of rolled barrel, reheated in gas furnace and packed in lime.
Marks, S 6 . . . . .
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000133 | .000133 | 0. | ..... | |
| 10,000 | .000300 | .000167 | ..... | ..... | |
| 20,000 | .000683 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000867 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 58,000 | .001967 | .000300 | ..... | ..... | Elastic limit. |
| 59,000 | .011333 | .009366 | ..... | ..... | |
| 60,000 | .011833 | .000500 | ..... | ..... | |
| 61,000 | .012067 | .000234 | ..... | ..... | |
| 62,000 | .012267 | .000200 | ..... | ..... | |
| 64,000 | .013000 | .000733 | ..... | ..... | |
| 66,000 | .015000 | .002000 | ..... | ..... | |
| 68,000 | .016333 | .001333 | ..... | ..... | |
| 72,000 | .019833 | .003500 | ..... | ..... | |
| 76,000 | .023000 | .003167 | ..... | ..... | |
| 80,000 | .027500 | .004500 | ..... | ..... | |
| 84,000 | .031333 | .003833 | ..... | ..... | |
| 88,000 | .036667 | .005334 | ..... | ..... | |
| 92,000 | .044000 | .007333 | ..... | ..... | |
| 96,000 | .053333 | .009333 | ..... | ..... | |
| 100,000 | .065000 | .011667 | ..... | ..... | |
| 105,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 105,400 |
| Elastic limit per square inch of original section | do... | 58,000 |
| Elongation per inch after rupture | inch.. | .1767 |
| Elongation per inch under strain at elastic limit | do... | .001967 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | ".6 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ".08, ".11, ".34* |

## No. 6502.

Rolled barrel, after reheating and annealing in lime.
Marks, S 6 . . . . . .
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000167 | .000167 | 0. | ..... | |
| 10,000 | .000333 | .000166 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001033 | .000366 | ..... | ..... | |
| 40,000 | .001367 | .000334 | ..... | ..... | |
| 50,000 | .001733 | .000366 | 0. | ..... | |
| 60,000 | .002067 | .000334 | ..... | ..... | |
| 67,000 | .002333 | .000266 | ..... | ..... | |
| 68,000 | .002367 | .000034 | ..... | ..... | Elastic limit. |
| 69,000 | .005667 | .003300 | ..... | ..... | |
| 70,000 | .007000 | .001333 | ..... | ..... | |
| 71,000 | .008167 | .001167 | ..... | ..... | |
| 74,000 | .010433 | .002266 | ..... | ..... | |
| 76,000 | .012333 | .001900 | ..... | ..... | |
| 78,000 | .013767 | .001434 | ..... | ..... | |
| 80,000 | .015400 | .001633 | ..... | ..... | |
| 84,000 | .019000 | .003600 | ..... | ..... | |
| 88,000 | .022333 | .003333 | ..... | ..... | |
| 92,000 | .026667 | .004334 | ..... | ..... | |
| 96,000 | .031000 | .004333 | ..... | ..... | |
| 100,000 | .036667 | .005667 | ..... | ..... | |
| 104,000 | .043333 | .006666 | ..... | ..... | |
| 108,000 | .055000 | .011667 | ..... | ..... | |
| 112,000 | .073333 | .018333 | ..... | ..... | |
| 114,700 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 114,700 |
| Elastic limit per square inch of original section | do... | 68,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .002367 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | 1".3 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".10, ".27*, ".20 |

No. 6508.

Marks, S 6.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | ..... | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001633 | .000333 | 0. | ..... | |
| 60,000 | .002000 | .000367 | ..... | ..... | |
| 68,000 | .002300 | .000300 | ..... | ..... | |
| 69,000 | .002333 | .000033 | ..... | ..... | Elastic limit. |
| 70,000 | .007167 | .004834 | ..... | ..... | |
| 71,000 | .007333 | .000166 | ..... | ..... | |
| 72,000 | .007867 | .000534 | ..... | ..... | |
| 74,000 | .009000 | .001133 | ..... | ..... | |
| 76,000 | .010067 | .001067 | ..... | ..... | |
| 80,000 | .013000 | .002933 | ..... | ..... | |
| 84,000 | .015267 | .002267 | ..... | ..... | |
| 88,000 | .018167 | .002900 | ..... | ..... | |
| 92,000 | .021167 | .003000 | ..... | ..... | |
| 96,000 | .024333 | .003166 | ..... | ..... | |
| 100,000 | .028000 | .003667 | ..... | ..... | |
| 104,000 | .032333 | .004333 | ..... | ..... | |
| 108,000 | .037000 | .004667 | ..... | ..... | |
| 112,000 | .439000 | .806900 | ..... | ..... | |
| 123,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 123,950 |
| Elastic limit per square inch of original section | do... | 69,000 |
| Elongation per inch after rupture | inch.. | .1733 |
| Elongation per inch under strain at elastic limit | do... | .002333 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | 1".24 from neck |
| Character of broken surface | | fine, silky |
| Elongation of inch sections | | ".24*, ".18, ".10 |

## No. 6550.

Marks, S 6.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000367 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 65,000 | .002200 | .000200 | ..... | ..... | |
| 66,000 | .002267 | .000067 | ..... | ..... | |
| 67,000 | .002300 | .000033 | ..... | ..... | |
| 68,000 | .002367 | .000067 | ..... | ..... | Elastic limit. |
| 69,000 | .007667 | .005300 | ..... | ..... | |
| 70,000 | .008300 | .000633 | ..... | ..... | |
| 72,000 | .009333 | .001033 | ..... | ..... | |
| 76,000 | .012000 | .002667 | ..... | ..... | |
| 80,000 | .015000 | .003000 | ..... | ..... | |
| 84,000 | .017333 | .002333 | ..... | ..... | |
| 88,000 | .020333 | .003000 | ..... | ..... | |
| 92,000 | .023667 | .003334 | ..... | ..... | |
| 96,000 | .027333 | .003666 | ..... | ..... | |
| 100,000 | .031333 | .004000 | ..... | ..... | |
| 104,000 | .036000 | .004667 | ..... | ..... | |
| 108,000 | .042167 | .006167 | ..... | ..... | |
| 112,000 | .049667 | .007500 | ..... | ..... | |
| 121,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 121,050 |
| Elastic limit per square inch of original section | do... | 68,000 |
| Elongation per inch after rupture | inch.. | .1767 |
| Elongation per inch under strain at elastic limit | do... | .002367 |
| Reduction in diameter at point of rupture | do... | .125 |
| Reduction in area after rupture, per cent. of original section | | 43.3 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".11, ".31*, ".11 |

No. 6551.

From rolled barrel.
Marks, S 6 R.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | ..... | ..... | |
| 10,000 | .000800 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000867 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001700 | .000867 | 0. | ..... | |
| 58,000 | .002000 | .000800 | ..... | ..... | |
| 59,000 | .002083 | .000333 | ..... | ..... | Elastic limit. |
| | .013333 | .011300 | ..... | ..... | |
| 60,000 | .016000 | .002667 | ..... | ..... | |
| 61,000 | .016500 | .000500 | ..... | ..... | |
| 62,000 | .017200 | .000700 | ..... | ..... | |
| 64,000 | .019167 | .001967 | ..... | ..... | |
| 66,000 | .021000 | .001833 | ..... | ..... | |
| 68,000 | .023000 | .002000 | ..... | ..... | |
| 72,000 | .028167 | .005167 | ..... | ..... | |
| 76,000 | .033667 | .005500 | ..... | ..... | |
| 80,000 | .040000 | .006333 | ..... | ..... | |
| 84,000 | .048000 | .008009 | ..... | ..... | |
| 88,000 | .060000 | .012000 | ..... | ..... | |
| 97,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 97,100 |
| Elastic limit per square inch of original section | do... | 59,000 |
| Elongation per inch after rupture | inch.. | .2767 |
| Elongation per inch under strain at elastic limit | do... | .002083 |
| Reduction in diameter at point of rupture | do... | .185 |
| Reduction in area after rupture, per cent of original section | | 59.8 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.18, ″.45+, ″.20 |

## No. 6552.

Marks, S 7.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001667 | .000334 | ..... | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 66,000 | .002200 | .000200 | ..... | ..... | |
| 67,000 | .002267 | .000067 | ..... | ..... | Elastic limit. |
| 68,000 | .008667 | .006400 | ..... | ..... | |
| 69,000 | .008833 | .000166 | ..... | ..... | |
| 70,000 | .009167 | .000334 | ..... | ..... | |
| 72,000 | .010333 | .001166 | ..... | ..... | |
| 76,000 | .012833 | .002500 | ..... | ..... | |
| 80,000 | .015667 | .002834 | ..... | ..... | |
| 84,000 | .018667 | .003000 | ..... | ..... | |
| 88,000 | .021667 | .003000 | ..... | ..... | |
| 92,000 | .025167 | .003500 | ..... | ..... | |
| 96,000 | .028667 | .003500 | ..... | ..... | |
| 100,000 | .032667 | .004000 | ..... | ..... | |
| 104,000 | .034333 | .001666 | ..... | ..... | |
| 108,000 | .043667 | .009334 | ..... | ..... | |
| 112,000 | .053333 | .009666 | ..... | ..... | |
| 120,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 120,500 |
| Elastic limit per square inch of original section | do... | 67,000 |
| Elongation per inch after rupture | inch.. | .1333 |
| Elongation per inch under strain at elastic limit | do... | .002267 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ".12, ".31*, ".12 |

## No. 6553.

From rolled barrel, reneated and annealed in lime.
Marks, S 7 R.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000800 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001633 | .000333 | 0. | ..... | |
| 60,000 | .002000 | .000367 | ..... | ..... | |
| 61,000 | .002033 | .000033 | ..... | ..... | |
| 62,000 | .002067 | .000034 | ..... | ..... | Elastic limit. |
| 63,000 | .012667 | .010600 | ..... | ..... | |
| 64,000 | .016067 | .003400 | ..... | ..... | |
| 65,000 | .016667 | .000600 | ..... | ..... | |
| 66,000 | .017367 | .000700 | ..... | ..... | |
| 68,000 | .019333 | .001966 | ..... | ..... | |
| 70,000 | .021333 | .002000 | ..... | ..... | |
| 72,000 | .023333 | .002000 | ..... | ..... | |
| 76,000 | .028000 | .004667 | ..... | ..... | |
| 80,000 | .032667 | .004667 | ..... | ..... | |
| 84,000 | .039000 | .006333 | ..... | ..... | |
| 88,000 | .046333 | .007333 | ..... | ..... | |
| 92,000 | .056667 | .010334 | ..... | ..... | |
| 102,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 102,050 |
| Elastic limit per square inch of original section | do... | 62,000 |
| Elongation per inch after rupture | inch.. | .2333 |
| Elongation per inch under strain at elastic limit | do... | .002067 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | 1″.46 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.13, ″.39*, ″.18 |

No. 6575.

Marks, S 8.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 69,000 | .002300 | .000300 | ..... | ..... | |
| 70,000 | .002333 | .000033 | ..... | ..... | Elastic limit. |
| | .011667 | .009334 | ..... | ..... | |
| 71,000 | .012033 | .000366 | ..... | ..... | |
| 72,000 | .012667 | .000634 | ..... | ..... | |
| 74,000 | .013667 | .001000 | ..... | ..... | |
| 76,000 | .016000 | .002333 | ..... | ..... | |
| 80,000 | .019000 | .003000 | ..... | ..... | |
| 84,000 | .022667 | .003667 | ..... | ..... | |
| 88,000 | .027000 | .004333 | ..... | ..... | |
| 92,000 | .031333 | .004333 | ..... | ..... | |
| 96,000 | .036667 | .005334 | ..... | ..... | |
| 100,000 | .043333 | .006666 | ..... | ..... | |
| 104,000 | .050667 | .007334 | ..... | ..... | |
| 113,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 113,500 |
| Elastic limit per square inch of original section | do... | 70,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .002333 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | 1".4 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ".15, ".31*, ".11 |

## No. 6577.

From rolled barrel.
Marks, S 8 R.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000133 | .000133 | 0. | ..... | |
| 10,000 | .000333 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | 0. | ..... | |
| 50,000 | .001700 | .000367 | ..... | ..... | |
| 55,000 | .001933 | .000233 | ..... | ..... | |
| 60,000 | .002100 | .000167 | ..... | ..... | |
| 65,000 | .002333 | .000233 | ..... | ..... | |
| 66,000 | .002367 | .000034 | ..... | ..... | |
| 67,000 | .002400 | .000033 | ..... | ..... | |
| 68,000 | .002433 | .000033 | ..... | ..... | Elastic limit. |
| | .011667 | .009234 | ..... | ..... | |
| 69,000 | .013333 | .001666 | ..... | ..... | |
| 70,000 | .014000 | .000667 | ..... | ..... | |
| 71,000 | .014333 | .000333 | ..... | ..... | |
| 72,000 | .015667 | .000334 | ..... | ..... | |
| 76,000 | .020333 | .004666 | ..... | ..... | |
| 80,000 | .024333 | .004000 | ..... | ..... | |
| 84,000 | .029000 | .004667 | ..... | ..... | |
| 88,000 | .034333 | .005333 | ..... | ..... | |
| 92,000 | .040667 | .006334 | ..... | ..... | |
| 96,000 | .049333 | .008666 | ..... | ..... | |
| 100,000 | .056667 | .007334 | ..... | ..... | |
| 108,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 108,000 |
| Elastic limit per square inch of original section | do... | 68,000 |
| Elongation per inch after rupture | inch.. | .1933 |
| Elongation per inch under strain at elastic limit | do... | .002433 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | ".90 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".10, ".18, ".35* |

## No. 6578.

From rolled barrel cooled in air, reheated in gas furnace, and annealed in lime.

Marks, S 8 R A.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | [illegible] | 0. | [illegible] | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001367 | .000367 | 0. | ..... | |
| 50,000 | .001700 | .000333 | ..... | ..... | |
| 60,000 | .002033 | .000333 | ..... | ..... | |
| 65,000 | .002233 | .000200 | ..... | ..... | |
| 70,000 | .002400 | .000167 | ..... | ..... | |
| 75,000 | .002600 | .000200 | ..... | ..... | |
| 80,000 | .002767 | .000167 | ..... | ..... | Elastic limit. |
| 81,000 | .002900 | .000133 | ..... | ..... | |
| | .031333 | .028433 | ..... | ..... | |
| 82,000 | .034333 | .003000 | ..... | ..... | |
| 83,000 | .034667 | .000334 | ..... | ..... | |
| 84,000 | .035067 | .000400 | ..... | ..... | |
| 86,000 | .037333 | .002266 | ..... | ..... | |
| 88,000 | .041333 | .004000 | ..... | ..... | |
| 92,000 | .050000 | .008667 | ..... | ..... | |
| 96,000 | .061333 | .011333 | ..... | ..... | |
| 105,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds | 105,500 |
| Elastic limit per square inch of original section | do | 80,000 |
| Elongation per inch after rupture | inch | .2433 |
| Elongation per inch under strain at elastic limit | do | .002767 |
| Reduction in diameter at point of rupture | do | .195 |
| Reduction in area after rupture, per cent of original section | | 62.2 |
| Position of rupture | | 1".5 from neck |
| Character of broken surface | | fine silky, serrated edges |
| Elongation of inch sections | | ".14, ".42*, ".17 |

No. 6589.

Marks, S 9.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001700 | .000367 | 0. | ..... | |
| 60,000 | .002033 | .000333 | ..... | ..... | |
| 64,000 | .002167 | .000134 | ..... | ..... | |
| 65,000 | .002200 | .000033 | ..... | ..... | Elastic limit. |
| 66,000 | .002667 | .000467 | ..... | ..... | |
| 67,000 | .003500 | .000833 | ..... | ..... | |
| 68,000 | .005667 | .002167 | ..... | ..... | |
| 69,000 | .008667 | .003000 | ..... | ..... | |
| 70,000 | .010000 | .001333 | ..... | ..... | |
| 72,000 | .011000 | .001000 | ..... | ..... | |
| 76,000 | .013667 | .002667 | ..... | ..... | |
| 80,000 | .016667 | .003000 | ..... | ..... | |
| 84,000 | .020000 | .003333 | ..... | ..... | |
| 88,000 | .023667 | .003667 | ..... | ..... | |
| 92,000 | .027500 | .003833 | ..... | ..... | |
| 96,000 | .031667 | .004167 | ..... | ..... | |
| 100,000 | .036333 | .004666 | ..... | ..... | |
| 104,000 | .043000 | .006667 | ..... | ..... | |
| 108,000 | .051000 | .008000 | ..... | ..... | |
| 117,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 117,600 |
| Elastic limit per square inch of original section | do.. | 65,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .002200 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1″.5 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ″.13, ″.33*, ″.11 |

## No. 6608.

Marks, S 9.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001700 | .000367 | 0. | ..... | |
| 60,000 | .002067 | .000367 | ..... | ..... | |
| 69,000 | .002400 | .000333 | ..... | ..... | Elastic limit. |
| 70,000 | .011000 | .008600 | ..... | ..... | |
| 71,000 | .011500 | .000500 | ..... | ..... | |
| 72,000 | .012067 | .000567 | ..... | ..... | |
| 74,000 | .013333 | .001266 | ..... | ..... | |
| 76,000 | .014667 | .001334 | ..... | ..... | |
| 80,000 | .017667 | .003000 | ..... | ..... | |
| 84,000 | .020833 | .003166 | ..... | ..... | |
| 88,000 | .023333 | .002500 | ..... | ..... | |
| 92,000 | .029333 | .006000 | ..... | ..... | |
| 96,000 | .033667 | .004334 | ..... | ..... | |
| 100,000 | .039333 | .005666 | ..... | ..... | |
| 104,000 | .045667 | .006334 | ..... | ..... | |
| 108,000 | .053333 | .007666 | ..... | ..... | |
| 116,000 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 116,000 |
| Elastic limit per square inch of original section | do... | 69,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .002400 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".12, ".33*, ".12 |

## No. 6611.

Marks, S–10.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000300 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001700 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000300 | ..... | ..... | |
| 70,000 | .002367 | .000367 | ..... | ..... | |
| 78,000 | .002433 | .000066 | ..... | ..... | Elastic limit. |
| 74,000 | .010333 | .007900 | ..... | ..... | |
| 76,000 | .011667 | .001334 | ..... | ..... | |
| 80,000 | .015000 | .003333 | ..... | ..... | |
| 84,000 | .018000 | .003000 | ..... | ..... | |
| 88,000 | .021167 | .003167 | ..... | ..... | |
| 92,000 | .024333 | .003166 | ..... | ..... | |
| 96,000 | .028667 | .004334 | ..... | ..... | |
| 100,000 | .033000 | .004333 | ..... | ..... | |
| 104,000 | .038333 | .005333 | ..... | ..... | |
| 108,000 | .045000 | .006667 | ..... | ..... | |
| 112,000 | .053333 | .008333 | ..... | ..... | |
| 119,200 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 119,200 |
| Elastic limit per square inch of original section | do... | 78,000 |
| Elongation per inch after rupture | inch.. | .1833 |
| Elongation per inch under strain at elastic limit | do... | .002433 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1″.3 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.18, ″.27*, ″.10 |

## No. 6617.

Marks, S 9–R A.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 69,000 | .002300 | .000300 | ..... | ..... | Elastic limit. |
| 70,000 | .024667 | .022367 | ..... | ..... | |
| 71,000 | .025667 | .001000 | ..... | ..... | |
| 72,000 | .027000 | .001333 | ..... | ..... | |
| 76,000 | .032000 | .005000 | ..... | ..... | |
| 80,000 | .039333 | .007333 | ..... | ..... | |
| 84,000 | .048000 | .008667 | ..... | ..... | |
| 88,000 | .060667 | .012667 | ..... | ..... | |
| 92,000 | .080000 | .019333 | ..... | ..... | |
| 97,550 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 97,550 |
| Elastic limit per square inch of original section | do... | 69,000 |
| Elongation per inch after rupture | inch.. | .2467 |
| Elongation per inch under strain at elastic limit | do... | .002300 |
| Reduction in diameter at point of rupture | do... | .195 |
| Reduction in area after rupture, per cent of original section | | 62.2 |
| Position of rupture | | 1″.7 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.15, ″.44*, ″.15 |

No. 6618.

Marks, S 10–R.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000200 | .000133 | ..... | ..... | |
| 20,000 | .000500 | .000300 | ..... | ..... | |
| 30,000 | .000833 | .000333 | ..... | ..... | |
| 40,000 | .001200 | .000367 | ..... | ..... | |
| 50,000 | .001633 | .000433 | —.000083 | —.000083 | |
| 60,000 | .001967 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000367 | ..... | ..... | |
| 71,000 | .002367 | .000033 | ..... | ..... | Elastic limit. |
| 72,000 | .015000 | .012633 | ..... | ..... | |
| 73,000 | .015600 | .000600 | ..... | ..... | |
| 74,000 | .016067 | .000467 | ..... | ..... | |
| 78,000 | .019833 | .003766 | ..... | ..... | |
| 82,000 | .023333 | .003500 | ..... | ..... | |
| 86,000 | .027667 | .004334 | ..... | ..... | |
| 90,000 | .032167 | .004500 | ..... | ..... | |
| 94,000 | .034167 | .002000 | ..... | ..... | |
| 98,000 | .045000 | .010833 | ..... | ..... | |
| 102,000 | .052667 | .007667 | ..... | ..... | |
| 111,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 111,950 |
| Elastic limit per square inch of original section | do.... | 71,000 |
| Elongation per inch after rupture | inch.. | .2133 |
| Elongation per inch under strain at elastic limit | do.... | .002367 |
| Reduction in diameter at point of rupture | do.... | .175 |
| Reduction in area after rupture, per cent of original section | | 67.2 |
| Position of rupture | | 1".62 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".12, ".87*, ".15 |

## No. 6619.

**Marks, S 10–R A.**
**Diameter, ″.505.**
**Sectional area, .20 square inch.**
**Gauged length, 3″.**

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000800 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000633 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 71,000 | .002367 | .000034 | ..... | ..... | |
| 72,000 | .002400 | .000033 | ..... | ..... | Elastic limit. |
| | .011667 | .009267 | ..... | ..... | |
| 73,000 | .012333 | .000666 | ..... | ..... | |
| 74,000 | .013000 | .000667 | ..... | ..... | |
| 76,000 | .014500 | .001500 | ..... | ..... | |
| 80,000 | .018667 | .004167 | ..... | ..... | |
| 84,000 | .022000 | .003333 | ..... | ..... | |
| 88,000 | .026333 | .004333 | ..... | ..... | |
| 92,000 | .031167 | .004834 | ..... | ..... | |
| 96,000 | .037000 | .005833 | ..... | ..... | |
| 100,000 | .044333 | .007333 | ..... | ..... | |
| 112,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 112,550 |
| Elastic limit per square inch of original section | do... | 72,000 |
| Elongation per inch after rupture | inch.. | .2133 |
| Elongation per inch under strain at elastic limit | do... | .002400 |
| Reduction in diameter at point of rupture | do... | .175 |
| Reduction in area after rupture, per cent of original section | | 57.2 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ″.12, ″.18, ″.34* |

No. 6621.

Marks, S 10–2.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000800 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002033 | .000366 | ..... | ..... | |
| 70,000 | .002367 | .000334 | ..... | ..... | Elastic limit. |
| | .007000 | .004633 | ..... | ..... | |
| 71,000 | .007667 | .000667 | ..... | ..... | |
| 72,000 | .008100 | .000433 | ..... | ..... | |
| 76,000 | .011000 | .002900 | ..... | ..... | |
| 80,000 | .013000 | .002000 | ..... | ..... | |
| 84,000 | .016000 | .003000 | ..... | ..... | |
| 88,000 | .019000 | .003000 | ..... | ..... | |
| 92,000 | .021667 | .002667 | ..... | ..... | |
| 96,000 | .025167 | .003500 | ..... | ..... | |
| 100,000 | .028667 | .003500 | ..... | ..... | |
| 104,000 | .033333 | .004666 | ..... | ..... | |
| 123,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 123,050 |
| Elastic limit, per square inch of original section | do... | 70,000 |
| Elongation per inch after rupture | inch.. | .1733 |
| Elongation per inch under strain at elastic limit | do... | .002367 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.11, ″.30*, ″.11 |

No. 6622.

Marks, S–11.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | [illegible] | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | [illegible] | .000667 | 0. | ..... | |
| 60,000 | .002033 | .000333 | ..... | ..... | |
| 70,000 | .002400 | .000367 | ..... | ..... | Elastic limit. |
| 71,000 | .012167 | .009767 | ..... | ..... | |
| 72,000 | .013000 | .000833 | ..... | ..... | |
| 74,000 | .014000 | .001000 | ..... | ..... | |
| 76,000 | .015500 | .001500 | ..... | ..... | |
| 80,000 | .019000 | .003500 | ..... | ..... | |
| 84,000 | .022667 | .003667 | ..... | ..... | |
| 88,000 | .027167 | .004500 | ..... | ..... | |
| 92,000 | .031000 | .003833 | ..... | ..... | |
| 96,000 | .036333 | .005333 | ..... | ..... | |
| 100,000 | .042667 | .006334 | ..... | ..... | |
| 104,000 | .051333 | .008666 | ..... | ..... | |
| 108,000 | .063333 | .012000 | ..... | ..... | |
| 114,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 114,100 |
| Elastic limit per square inch of original section | do... | 70,000 |
| Elongation per inch after rupture | inch.. | .1967 |
| Elongation per inch under strain at elastic limit | do... | .002400 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1".3 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | #.20, #.29*, #.11 |

## No. 6631.

Marks, S–12.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000800 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001633 | .000333 | 0. | ..... | |
| 60,000 | .002000 | .000367 | ..... | ..... | |
| 68,000 | .002267 | .000267 | ..... | ..... | |
| 69,000 | .002300 | .000033 | ..... | ..... | Elastic limit. |
| 70,000 | .014333 | .012033 | ..... | ..... | |
| 71,000 | .015000 | .000667 | ..... | ..... | |
| 72,000 | .015600 | .000600 | ..... | ..... | |
| 74,000 | .017333 | .001733 | ..... | ..... | |
| 76,000 | .019333 | .002000 | ..... | ..... | |
| 80,000 | .023000 | .003667 | ..... | ..... | |
| 84,000 | .027667 | .004667 | ..... | ..... | |
| 88,000 | .032667 | .005000 | ..... | ..... | |
| 92,000 | .037500 | .004833 | ..... | ..... | |
| 96,000 | .045333 | .007833 | ..... | ..... | |
| 100,000 | .054000 | .008667 | ..... | ..... | |
| 109,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 109,600 |
| Elastic limit per square inch of original section | do... | 69,000 |
| Elongation per inch after rupture | inch.. | .2133 |
| Elongation per inch under strain at elastic limit | do... | .002300 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".18, ".37*, ".14 |

No. 6641.

Marks, S–13.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square | Elongation per inch | Successive elongation | Permanent set | Successive permanent | Remarks. |
|---|---|---|---|---|---|

## No. 6719.

Marks, S 14.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002083 | .000866 | ..... | ..... | |
| 70,000 | .002367 | .000334 | ..... | ..... | |
| 71,000 | .002400 | .000033 | ..... | ..... | Elastic limit. |
| 72,000 | .015667 | .013267 | ..... | ..... | |
| 74,000 | .017000 | .001333 | ..... | ..... | |
| 76,000 | .019000 | .002000 | ..... | ..... | |
| 80,000 | .023333 | .004333 | ..... | ..... | |
| 84,000 | .027667 | .004334 | ..... | ..... | |
| 88,000 | .033333 | .005666 | ..... | ..... | |
| 92,000 | .040333 | .007000 | ..... | ..... | |
| 96,000 | .048667 | .008334 | ..... | ..... | |
| 100,000 | .060667 | .012000 | ..... | ..... | |
| 108,000 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 108,000 |
| Elastic limit per square inch of original section | do... | 71,000 |
| Elongation per inch after rupture | inch.. | .2167 |
| Elongation per inch under strain at elastic limit | do... | .002400 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | 1".4 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".12, ".35*, ".18 |

## No. 6736.

**Marks, S–14.**
**Diameter, ".505.**
**Sectional area, .20 square inch.**
**Gauged length, 3".**

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000833 | .000533 | ..... | ..... | |
| 30,000 | .001000 | .000167 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 60,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002267 | .000267 | ..... | ..... | |
| 71,000 | .002400 | .000133 | ..... | ..... | |
| 72,000 | .002433 | .000033 | ..... | ..... | Elastic limit. |
| 73,000 | .016667 | .014234 | ..... | ..... | |
| 74,000 | .018100 | .001433 | ..... | ..... | |
| 76,000 | .020833 | .002733 | ..... | ..... | |
| 80,000 | .023333 | .002500 | ..... | ..... | |
| 84,000 | .028000 | .004667 | ..... | ..... | |
| 88,000 | .034333 | .006333 | ..... | ..... | |
| 92,000 | .039500 | .005167 | ..... | ..... | |
| 96,000 | .046333 | .006833 | ..... | ..... | |
| 100,000 | .060000 | .011667 | ..... | ..... | |
| 106,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Textile strength per square inch of original section | pounds.. | 106,500 |
| Elastic limit per square inch of original section | do.... | 72,000 |
| Elongation per inch after rupture | inch.. | .2333 |
| Elongation per inch under strain at elastic limit | do.... | .002433 |
| Reduction in diameter at point of rupture | do.... | .175 |
| Reduction in area after rupture, per cent of original section | | 57.2 |
| Position of rupture | | 1".4 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | .19, .38, .13 |

## No. 6757.

Marks, S 15.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000800 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | ..... | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 71,000 | .002367 | .000034 | ..... | ..... | Elastic limit. |
| 72,000 | .012333 | .009966 | ..... | ..... | |
| 74,000 | .013500 | .001167 | ..... | ..... | |
| 76,000 | .015167 | .001667 | ..... | ..... | |
| 80,000 | .018333 | .003166 | ..... | ..... | |
| 84,000 | .022067 | .003734 | ..... | ..... | |
| 88,000 | .026000 | .003933 | ..... | ..... | |
| 92,000 | .030667 | .004667 | ..... | ..... | |
| 96,000 | .035000 | .004333 | ..... | ..... | |
| 100,000 | .042500 | .007500 | ..... | ..... | |
| 113,850 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 113,850 |
| Elastic limit per square inch of original section | do... | 71,000 |
| Elongation per inch after rupture | inch.. | .2200 |
| Elongation per inch under strain at elastic limit | do... | .002367 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | 1″.3 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.20, ″.34*, ″.12 |

No. 6786.

Rolled barrel, butt.
Marks, S 15 R B.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | | |
| 10,000 | .000333 | .000233 | | | |
| 15,000 | .000667 | .000334 | | | |
| 20,000 | .001000 | .000333 | | | |
| 40,000 | .001333 | .000333 | | | |
| 50,000 | .001700 | .000367 | | | |
| 60,000 | .002033 | .000333 | 0. | | |
| 70,000 | .002367 | .000334 | | | Elastic limit. |
| 71,000 | .012333 | .009966 | | | |
| 72,000 | .013000 | .000667 | | | |
| 76,000 | .015666 | .002633 | | | |
| 80,000 | .018667 | .002834 | | | |
| 84,000 | .022500 | .003833 | | | |
| 88,000 | .026000 | .003500 | | | |
| 92,000 | .030667 | .004667 | | | |
| 96,000 | .035333 | .004666 | | | |
| 100,000 | .041000 | .005667 | | | |
| 104,000 | .048333 | .007333 | | | |
| 115,300 | | | | | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds | 115,300 |
| Elastic limit per square inch of original section | do | 70,000 |
| Elongation per inch after rupture | inch | .1867 |
| Elongation per inch under strain at elastic limit | do | .002367 |
| Reduction in diameter at point of rupture | do | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | 1".1 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".08, ".15, ".33* |

No. 6787.

Rolled barrel, muzzle.
Marks, S 15 R M.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000333 | .000266 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | ..... | ..... | |
| 60,000 | .002000 | .000333 | 0. | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 74,000 | .002533 | .000200 | ..... | ..... | Elastic limit. |
| 75,000 | .012667 | .000134 | ..... | ..... | |
| 76,000 | .013333 | .000666 | ..... | ..... | |
| 80,000 | .016333 | .003000 | ..... | ..... | |
| 84,000 | .019667 | .003334 | ..... | ..... | |
| 88,000 | .023000 | .003333 | ..... | ..... | |
| 92,000 | .026667 | .003667 | ..... | ..... | |
| 96,000 | .031000 | .004333 | ..... | ..... | |
| 100,000 | .036333 | .005333 | ..... | ..... | |
| 104,000 | .042667 | .006334 | ..... | ..... | |
| 118,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 118,000 |
| Elastic limit per square inch of original section | do... | 74,000 |
| Elongation per inch after rupture | inch.. | .1967 |
| Elongation per inch under strain at elastic limit | do... | .002533 |
| Reduction in diameter at point of rupture | do... | .175 |
| Reduction in area after rupture, per cent of original section | | 57.2 |
| Position of rupture | | 1".4 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".10, ".34*, ".15 |

## No. 6788.

Rolled barrel, annealed.
Marks, S 15 R A B.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000833 | .000266 | ..... | ..... | |
| 20,000 | .000667 | .000834 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | ..... | ..... | |
| 60,000 | .002000 | .000333 | 0. | ..... | |
| 64,000 | .002133 | .000133 | ..... | ..... | |
| 65,000 | .002167 | .000034 | ..... | ..... | Elastic limit. |
| 66,000 | .024333 | .022166 | ..... | ..... | |
| 67,000 | .025167 | .000834 | ..... | ..... | |
| 68,000 | .026333 | .001166 | ..... | ..... | |
| 72,000 | .032000 | .005667 | ..... | ..... | |
| 76,000 | .037000 | .005000 | ..... | ..... | |
| 80,000 | .045000 | .008000 | ..... | ..... | |
| 84,000 | .053333 | .008333 | ..... | ..... | |
| 95,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 95,500 |
| Elastic limit per square inch of original section | do... | 65,000 |
| Elongation per inch after rupture | inch.. | .2133 |
| Elongation per inch under strain at elastic limit | do... | .002167 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | 1".1 from neck |
| Character of broken surface | | fine silky, serrated |
| Elongation of inch sections | | ".34*, ".19, ".11 |

## No. 6789.

Marks, S 15 R A M.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | ..... | ..... | |
| 60,000 | .002000 | .000333 | 0. | ..... | |
| 65,000 | .002167 | .000167 | ..... | ..... | |
| 66,000 | .002200 | .000033 | ..... | ..... | Elastic limit. |
| 67,000 | .027333 | .025133 | ..... | ..... | |
| 68,000 | .028767 | .001434 | ..... | ..... | |
| 72,000 | .034667 | .005900 | ..... | ..... | |
| 76,000 | .042000 | .007333 | ..... | ..... | |
| 80,000 | .051333 | .009333 | ..... | ..... | |
| 84,000 | .062667 | .011334 | ..... | ..... | |
| 93,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 93,600 |
| Elastic limit per square inch of original section | do... | 66,000 |
| Elongation per inch after rupture | inch.. | .2433 |
| Elongation per inch under strain at elastic limit | do... | .002200 |
| Reduction in diameter at point of rupture | do... | .175 |
| Reduction in area after rupture, per cent of original section | | 57.2 |
| Position of rupture | | 1".4 from neck |
| Character of broken surface | | silky, serrated |
| Elongation of inch sections | | ".14, ".38, ".21 |

## No. 6791.

Finished barrel, oil tempered.
Marks, S 15 O T.
Sectional area, .25 square inch.
Gauged length, 1″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .0001 | .0001 | ..... | ..... | |
| 10,000 | .0002 | .0001 | ..... | ..... | |
| 20,000 | .0004 | .0002 | ..... | ..... | |
| 30,000 | .0008 | .0004 | ..... | ..... | |
| 40,000 | .0011 | .0003 | ..... | ..... | |
| 50,000 | .0013 | .0002 | ..... | ..... | |
| 54,000 | .0017 | .0004 | ..... | ..... | Elastic limit. |
| 56,000 | .0019 | .0002 | ..... | ..... | |
| | .0050 | .0031 | ..... | ..... | |
| 57,000 | .0065 | .0015 | ..... | ..... | |
| 58,000 | .0100 | .0035 | ..... | ..... | |
| 59,000 | .0135 | .0035 | ..... | ..... | |
| 60,000 | .0168 | .0033 | ..... | ..... | |
| 64,000 | .0210 | .0042 | ..... | ..... | |
| 68,000 | .0255 | .0045 | ..... | ..... | |
| 72,000 | .0302 | .0047 | ..... | ..... | |
| 76,000 | .0369 | .0067 | ..... | ..... | |
| 80,000 | .0440 | .0071 | ..... | ..... | |
| 96,320 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 96,320 |
| Elastic limit per square inch of original section | do.... | 54,000 |
| Elongation per inch after rupture | inch.. | .27 |
| Elongation per inch under strain at elastic limit | do.... | .0017 |
| Reduction in diameter at point of rupture (exterior) | do.... | .1008 |
| Character of broken surface | | silky, cup shaped |

## No. 6808.

Marks, S 16.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | ..... | ..... | |
| 60,000 | .002033 | .000366 | ..... | ..... | |
| 70,000 | .002367 | .000334 | ..... | ..... | |
| 75,000 | .002567 | .000200 | ..... | ..... | |
| 78,000 | .002667 | .000100 | ..... | ..... | Elastic limit. |
| 79,000 | .011667 | .009000 | ..... | ..... | |
| 80,000 | .012333 | .000666 | ..... | ..... | |
| 84,000 | .015333 | .003000 | ..... | ..... | |
| 88,000 | .018000 | .002667 | ..... | ..... | |
| 92,000 | .021667 | .003667 | ..... | ..... | |
| 96,000 | .025000 | .003333 | ..... | ..... | |
| 100,000 | .028333 | .003333 | ..... | ..... | |
| 104,000 | .033000 | .004167 | ..... | ..... | |
| 108,000 | .038333 | .005333 | ..... | ..... | |
| 112,000 | .045167 | .006834 | ..... | ..... | |
| 123,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 123,900 |
| Elastic limit per square inch of original section | do... | 78,000 |
| Elongation per inch after rupture | inch.. | .1633 |
| Elongation per inch under strain at elastic limit | do... | .002667 |
| Reduction in diameter at point of rupture | do... | .115 |
| Reduction in area after rupture, per cent of original section | | 40.3 |
| Position of rupture | | 1".22 from neck |
| Character of broken surface | | silky, cup shaped |
| Elongation of inch sections | | ".10, ".20, ".19 |

No. 6809.

Rolled barrel, butt.
Marks, S 16 R B.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|

No. 6810.

Rolled barrel, muzzle.
Marks, S 16 R M.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 8".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 15,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000533 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000667 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002367 | .000367 | ..... | ..... | |
| 80,000 | .002733 | .000366 | ..... | ..... | |
| 81,000 | .002767 | .000034 | ..... | ..... | Elastic limit. |
| | .013567 | .010800 | ..... | ..... | |
| 82,000 | .014667 | .001000 | ..... | ..... | |
| 84,000 | .015667 | .001000 | ..... | ..... | |
| 88,000 | .018833 | .003166 | ..... | ..... | |
| 92,000 | .022000 | .003167 | ..... | ..... | |
| 96,000 | .025667 | .003667 | ..... | ..... | |
| 100,000 | .029667 | .004000 | ..... | ..... | |
| 104,000 | .034000 | .004333 | ..... | ..... | |
| 108,000 | .040000 | .006000 | ..... | ..... | |
| 123,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 123,100 |
| Elastic limit per square inch of original section | do... | 81,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .002767 |
| Reduction in diameter at point of rupture | do... | .156 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1".4 from neck |
| Character of broken surface | | fine silky, cup shaped |

## No. 6811.

Rolled barrel annealed at butt.
Marks, S 16 R A B.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per | Elongation | Successive | Permanent | Successive |
|---|---|---|---|---|

## No. 6812.

Rolled barrel, annealed at muzzle.
Marks, S 16 R A M.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001700 | .000367 | 0. | ..... | |
| 60,000 | .002033 | .000333 | ..... | ..... | Elas .c limit. |
| 61,000 | .022333 | .020300 | ..... | ..... | |
| 62,000 | .028167 | .000834 | ..... | ..... | |
| 64,000 | .024833 | .001666 | ..... | ..... | |
| 68,000 | .030333 | .005500 | ..... | ..... | |
| 72,000 | .036667 | .006334 | ..... | ..... | |
| 76,000 | .044833 | .008166 | ..... | ..... | |
| 80,000 | .054667 | .009834 | ..... | ..... | |
| 91,500 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 91,500 |
| Elastic limit per square inch of original section | do... | 60,000 |
| Elongation per inch after rupture | inch.. | .2433 |
| Elongation per inch under strain at elastic limit | do... | .002033 |
| Reduction in diameter at point of rupture | do... | .185 |
| Reduction in area after rupture, per cent of original section | | 59.8 |
| Position of rupture | | 1".4 from neck |
| Character of broken surface | | fine silky, serrated edges |
| Elongation of inch sections | | ".22, ".38*, ".18 |

No. 6814.

Marks. S 16 O T.
Sectional area, .25 square inch.
Gauged length, 1″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | |
| 5,000 | .0001 | .0001 | 0. | ..... | Initial load. |
| 10,000 | .0003 | .0002 | ..... | ..... | |
| 20,000 | .0006 | .0003 | ..... | ..... | |
| 30,000 | .0010 | .0004 | ..... | ..... | |
| 40,000 | .0014 | .0004 | ..... | ..... | |
| 50,000 | .0018 | .0004 | ..... | ..... | |
| 58,000 | .0021 | .0003 | ..... | ..... | Elastic limit. |
| 59,000 | .0078 | .0057 | ..... | ..... | |
| 60,000 | .0107 | .0029 | ..... | ..... | |
| 62,000 | .0123 | .0016 | ..... | ..... | |
| 64,000 | .0136 | .0013 | ..... | ..... | |
| 68,000 | .0172 | .0036 | ..... | ..... | |
| 72,000 | .0208 | .0031 | ..... | ..... | |
| 76,000 | .0240 | .0037 | ..... | ..... | |
| 80,000 | .0282 | .0042 | ..... | ..... | |
| 105,840 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 105,840 |
| Elastic limit per square inch of original section | do... | 58,000 |
| Elongation per inch after rupture | inch.. | .15 |
| Elongation per inch under strain at elastic limit | do... | .0021 |
| Reduction in diameter at point of rupture (exterior) | do... | .0306 |
| Character of broken surface | | fine granular |

## No. 6885.

Marks, S 17.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000800 | .000288 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001700 | .000367 | 0. | ..... | |
| 60,000 | .002033 | .000333 | ..... | ..... | |
| 70,000 | .002400 | .000367 | ..... | ..... | Elastic limit. |
| 71,000 | .002500 | .000100 | ..... | ..... | |
| 72,000 | .011333 | .008833 | ..... | ..... | |
| 74,000 | .013000 | .001667 | ..... | ..... | |
| 76,000 | .014500 | .001500 | ..... | ..... | |
| 80,000 | .018000 | .003500 | ..... | ..... | |
| 84,000 | .021000 | .003000 | ..... | ..... | |
| 88,000 | .025333 | .004333 | ..... | ..... | |
| 92,000 | .029333 | .004000 | ..... | ..... | |
| 96,000 | .034500 | .005167 | ..... | ..... | |
| 100,000 | .041333 | .006833 | ..... | ..... | |
| 115,300 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 115,300 |
| Elastic limit per square inch of original section | do... | 70,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do... | .002400 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | 1".6 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".13, ".33*, ".14 |

## No. 6895.

Rolled barrel.
Marks, $\frac{S\ 17}{R}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000333 | .000266 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002033 | .000366 | ..... | ..... | |
| 70,000 | .002367 | .000334 | ..... | ..... | |
| 75,000 | .002600 | .000233 | ..... | ..... | |
| 78,000 | .002700 | .000100 | ..... | ..... | |
| 79,000 | .002733 | .000033 | ..... | ..... | Elastic limit. |
| 80,000 | .023333 | .020600 | ..... | ..... | |
| 82,000 | .024667 | .001334 | ..... | ..... | |
| 84,000 | .027000 | .002333 | ..... | ..... | |
| 88,000 | .032000 | .005000 | ..... | ..... | |
| 92,000 | .036333 | .004333 | ..... | ..... | |
| 96,000 | .043333 | .007000 | ..... | ..... | |
| 100,000 | .051667 | .008334 | ..... | ..... | |
| 112,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 112,050 |
| Elastic limit per square inch of original section | do... | 79,000 |
| Elongation per inch after rupture | inch.. | .2233 |
| Elongation per inch under strain at elastic limit | do... | .002733 |
| Reduction in diameter at point of rupture | do... | .175 |
| Reduction in area after rupture, per cent of original section | | 57.2 |
| Position of rupture | | at middle of the stem |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".14, ".39*, ".14 |

## No. 6896.

Rolled barrel, annealed.
Marks, $\frac{S\ 17}{R\ A}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000800 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000867 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002033* | .000366 | ..... | ..... | |
| 70,000 | .002400 | .000367 | ..... | ..... | |
| 75,000 | .002633 | .000233 | ..... | ..... | |
| 76,000 | .002667 | .000034 | ..... | ..... | Elastic limit. |
| | .022667 | .020000 | ..... | ..... | |
| 77,000 | .022800 | .000133 | ..... | ..... | |
| 78,000 | .022967 | .000167 | ..... | ..... | |
| 80,000 | .025067 | .002100 | ..... | ..... | |
| 84,000 | .029333 | .004266 | ..... | ..... | |
| 88,000 | .034333 | .005000 | ..... | ..... | |
| 92,000 | .041000 | .006667 | ..... | ..... | |
| 96,000 | .048333 | .007333 | ..... | ..... | |
| 100,000 | .059667 | .011334 | ..... | ..... | |
| 109,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 109,500 |
| Elastic limit per square inch of original section | do... | 76,000 |
| Elongation per inch after rupture | inch.. | .2100 |
| Elongation per inch under strain at elastic limit | do... | .002667 |
| Reduction in diameter at point of rupture | do... | .175 |
| Reduction in area after rupture, per cent of original section | | 57.2 |
| Position of rupture | | 1" from neck |
| Character and broken surface | | fine silky, serrated |
| Elongation of inch sections | | ".10, ".17, ".36* |

## No. 6917.

Finished barrel, oil tempered.
Marks, $\frac{S\ 17}{O\ T}$
Sectional area, .25 square inch.
Gauged length, 1".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .0001 | .0001 | 0. | ..... | |
| 10,000 | .0003 | .0002 | ..... | ..... | |
| 20,000 | .0006 | .0003 | ..... | ..... | |
| 30,000 | .0009 | .0003 | ..... | ..... | |
| 40,000 | .0012 | .0003 | ..... | ..... | |
| 50,000 | .0016 | .0004 | 0. | ..... | |
| 60,000 | .0020 | .0004 | ..... | ..... | |
| 64,000 | .0022 | .0002 | ..... | ..... | Elastic limit. |
| 65,000 | .0095 | .0073 | ..... | ..... | |
| 66,000 | .0130 | .0035 | ..... | ..... | |
| 67,000 | .0137 | .0007 | ..... | ..... | |
| 68,000 | .0145 | .0008 | ..... | ..... | |
| 70,000 | .0155 | .0010 | ..... | ..... | |
| 72,000 | .0177 | .0022 | ..... | ..... | |
| 76,000 | .0210 | .0033 | ..... | ..... | |
| 80,000 | .0253 | .0043 | ..... | ..... | |
| 107,800 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 107,800 |
| Elastic limit per square inch of original section | do... | 64,000 |
| Elongation per inch after rupture | inch.. | .27 |
| Elongation per inch under strain at elastic limit | do... | .0022 |
| Reduction in diameter at point of rupture (exterior) | do... | .1188 |
| Character of broken surface | | silky, cup shaped |

## No. 6851.

Marks, S 18.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002367 | .000367 | ..... | ..... | |
| 74,000 | .002533 | .000166 | ..... | ..... | |
| 75,000 | .002600 | .000067 | ..... | ..... | |
| 76,000 | .002633 | .000033 | ..... | ..... | |
| 77,000 | .002667 | .000034 | ..... | ..... | Elastic limit. |
| 79,000 | .012833 | .010166 | ..... | ..... | |
| 80,000 | .013433 | .000600 | ..... | ..... | |
| 84,000 | .017000 | .003567 | ..... | ..... | |
| 88,000 | .020500 | .003500 | ..... | ..... | |
| 92,000 | .024167 | .003667 | ..... | ..... | |
| 96,000 | .028333 | .004166 | ..... | ..... | |
| 100,000 | .033333 | .005000 | ..... | ..... | |
| 104,000 | .039333 | .006500 | ..... | ..... | |
| 118,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 118,100 |
| Elastic limit per square inch of original section | do... | 77,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .002667 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1".2 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".10, ".27*, ".20* |

No. 6852.

Marks, S 19.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | | |
| 10,000 | .000333 | .000233 | | | |
| 20,000 | .000667 | .000334 | | | |
| 30,000 | .001000 | .000333 | | | |
| 40,000 | .001367 | .000367 | | | |
| 50,000 | .001700 | .000333 | | | |
| 60,000 | .002083 | .000383 | | | |
| 70,000 | .002367 | .000334 | | | |
| 73,000 | .002533 | .000166 | | | Elastic limit. |
| 74,000 | .012500 | .009967 | | | |
| 75,000 | .013000 | .000500 | | | |
| 76,000 | .013500 | .000500 | | | |
| 78,000 | .015167 | .001667 | | | |
| 80,000 | .016667 | .001500 | | | |
| 84,000 | .020333 | .003666 | | | |
| 88,000 | .023667 | .003334 | | | |
| 92,000 | .027833 | .004166 | | | |
| 96,000 | .033000 | .005167 | | | |
| 100,000 | .038333 | .005333 | | | |
| 104,000 | .045667 | .007334 | | | |
| 116,000 | | | | | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength, per square inch of original section | pounds.. | 116,000 |
| Elastic limit per square inch of original section | ..do... | 73,000 |
| Elongation per inch after rupture | inch.. | .1967 |
| Elongation per inch under strain at elastic limit | do.... | .002533 |
| Reduction in diameter at point of rupture | do.... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | 1″.2 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.11, ″.29*, ″.19 |

## No. 6871.

Marks, S 20.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000183 | .000133 | 0. | ..... | |
| 10,000 | .000383 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000384 | ..... | ..... | |
| 30,000 | .001000 | .000833 | ..... | ..... | |
| 40,000 | .001833 | .000383 | ..... | ..... | |
| 50,000 | .001700 | .000367 | 0. | ..... | |
| 60,000 | .002033 | .000333 | ..... | ..... | |
| 70,000 | .002400 | .000367 | ..... | ..... | |
| 75,000 | .002600 | .000200 | ..... | ..... | |
| 76,000 | .002633 | .000033 | ..... | ..... | Elastic limit. |
| 77,000 | .015333 | .012700 | ..... | ..... | |
| 78,000 | .016067 | .000734 | ..... | ..... | |
| 80,000 | .017500 | .001433 | ..... | ..... | |
| 84,000 | .020667 | .003167 | ..... | ..... | |
| 88,000 | .025667 | .005000 | ..... | ..... | |
| 92,000 | .030000 | .004333 | ..... | ..... | |
| 96,000 | .035000 | .005000 | ..... | ..... | |
| 100,000 | .041667 | .006667 | ..... | ..... | |
| 115,500 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 115,500 |
| Elastic limit per square inch of original section | do... | 76,000 |
| Elongation per inch after rupture | inch.. | .2033 |
| Elongation per inch under strain at elastic limit | do... | .002633 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.12, ″.37*, ″.12 |

## No. 7205.

**Marks, S 26.**
**Diameter, ″.505.**
**Sectional area, .20 square inch.**
**Gauged length, 3″.**

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000267 | .000200 | ..... | ..... | |
| 20,000 | .000600 | .000333 | ..... | ..... | |
| 30,000 | .000933 | .000333 | ..... | ..... | |
| 40,000 | .001267 | .000334 | ..... | ..... | |
| 50,000 | .001600 | .000333 | 0. | ..... | |
| 60,000 | .001967 | .000367 | ..... | ..... | |
| 68,000 | .002267 | .000300 | ..... | ..... | Elastic limit. |
| 69,000 | .007900 | .005633 | ..... | ..... | |
| 70,000 | .008333 | .000433 | ..... | ..... | |
| 71,000 | .008833 | .000500 | ..... | ..... | |
| 72,000 | .009667 | .000834 | ..... | ..... | |
| 76,000 | .012333 | .002666 | ..... | ..... | |
| 80,000 | .015267 | .002934 | ..... | ..... | |
| 84,000 | .018067 | .002800 | ..... | ..... | |
| 88,000 | .021333 | .003266 | ..... | ..... | |
| 92,000 | .025000 | .003667 | ..... | ..... | |
| 96,000 | .029333 | .004333 | ..... | ..... | |
| 100,000 | .034000 | .004667 | ..... | ..... | |
| 104,000 | .0433 | .0093 | ..... | ..... | |
| 108,000 | .0500 | .0067 | ..... | ..... | |
| 112,000 | .0600 | .0100 | ..... | ..... | |
| 118,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 118,400 |
| Elastic limit per square inch of original section | do... | 68,000 |
| Elongation per inch after rupture | inch.. | .1333 |
| Elongation per inch under strain at elastic limit | do.... | .002267 |
| Reduction in diameter at point of rupture | do.... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | 1″.53 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.10, ″.89, ″.12 |

No. 7206.

Marks, S 26.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 122,700 |
| Elastic limit per square inch of original section | do... | 69,000 |
| Elongation per inch after rupture | inch.. | .1767 |
| Elongation per inch under strain at elastic limit | do... | .002833 |
| Reduction in diameter at point of rupture | do... | .185 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | *.11, *.31*, *.12 |

No. 7207.

Marks, S 26.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | | |
| 1,000 | 0. | 0. | 0. | | |
| 5,000 | .000067 | .000067 | 0. | | |
| 10,000 | .000300 | .000233 | ..... | | |
| 20,000 | .000633 | .000333 | ..... | | |
| 30,000 | .000967 | .000334 | ..... | | |
| 40,000 | .001300 | .000333 | ..... | | |
| 50,000 | .001667 | .000367 | 0. | | |
| 60,000 | .002000 | .000333 | ..... | | |
| 67,000 | .002233 | .000233 | ..... | | |
| 68,000 | .006667 | .004434 | ..... | | |
| 69,000 | .007333 | .000666 | ..... | | |
| 70,000 | .007667 | .000334 | ..... | | |
| 72,000 | .008833 | .001166 | ..... | | |
| 76,000 | .011533 | .002700 | ..... | | |
| 80,000 | .014000 | .002467 | ..... | | |
| 84,000 | .016967 | .002967 | ..... | | |
| 88,000 | .019667 | .002734 | ..... | | |
| 92,000 | .022200 | .002533 | ..... | | |
| 96,000 | .026667 | .003467 | ..... | | |
| 100,000 | .030400 | .003733 | ..... | | |
| 104,000 | .0367 | .0063 | ..... | | |
| 108,000 | .0433 | .0066 | ..... | | |
| 112,000 | .0533 | .0100 | ..... | | |
| 116,000 | .0633 | .0100 | ..... | | |
| 120,000 | .1000 | .0367 | ..... | | |
| 120,500 | ..... | ..... | ..... | | |

*General su*

Tensile strength per square inch of original section
Elastic limit per square inch of original section ....
Elongation per inch after rupture.....
Elongation per inch under strain at elastic limit ...
Reduction in diameter at point of rupture.....
Reduction in area after rupture, per cent of original
Position of rupture .....
Character of broken surface.....
Elongation of inch sections.....

No. 6466.

From breech of barrel, annealed at low heat in charcoal.
Marks, S G C.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.
Green end bar.

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds | 104,900 |
| Elastic limit per square inch of original section | do | 64,000 |
| Elongation per inch after rupture | inch | .1888 |
| Elongation per inch under strain at elastic limit | do | .002283 |
| Reduction in diameter at point of rupture | do | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | ″.65 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.34″, ″.18, ″.06 |

## No. 6467.

From breech of barrel, annealed at low heat in line. Duplicate of No. 6466.
Marks, S G L.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".
Green end bar.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 35,000 | .001133 | .000133 | ..... | ..... | |
| 40,000 | .001333 | .000200 | ..... | ..... | |
| 50,000 | .001667 | .000334 | ..... | ..... | |
| 60,000 | .002033 | .000366 | ..... | ..... | |
| 65,000 | .002200 | .000167 | ..... | ..... | |
| 66,000 | .002233 | .000033 | ..... | ..... | |
| 67,000 | .002300 | .000067 | ..... | ..... | |
| 68,000 | .002300 | 0. | ..... | ..... | |
| 69,000 | .002333 | .000033 | ..... | ..... | Elastic limit. |
| | .019667 | .017334 | ..... | ..... | |
| 70,000 | .019733 | .000066 | ..... | ..... | |
| 72,000 | .020333 | .000600 | ..... | ..... | |
| 74,000 | .022500 | .002167 | ..... | ..... | |
| 76,000 | .024667 | .002167 | ..... | ..... | |
| 80,000 | .029167 | .004500 | ..... | ..... | |
| 84,000 | .034667 | .005500 | ..... | ..... | |
| 88,000 | .040000 | .005333 | ..... | ..... | |
| 92,000 | .051333 | .011333 | ..... | ..... | |
| 96,000 | .058333 | .007000 | ..... | ..... | |
| 105,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 105,400 |
| Elastic limit per square inch of original section | do... | 69,000 |
| Elongation per inch after rupture | inch.. | .2067 |
| Elongation per inch under strain at elastic limit | do... | .002333 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | 1".05 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ".34*, ".17, ".11 |

No. 6468.

From breech of barrel, annealed at low heat in charcoal.
Marks, S R C.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.
Red end bar.

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds | 111,360 |
| Elastic limit per square inch of original section | do | 68,000 |
| Elongation per inch after rupture | inch | .2000 |
| Elongation per inch under strain at elastic limit | do | .002967 |
| Reduction in diameter at point of rupture | do | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1″.70 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.13, ″.38, ″.13 |

No. 6469.

From breech of barrel, annealed at low heat in lime. Duplicate of No. 6468.

Marks, S R L.

Diameter, ".505.

## No. 6470.

From breech of barrel too hard to drill, annealed at low heat in charcoal. Open-hearth steel.

Marks, S 4.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 35,000 | .001100 | .000100 | ..... | ..... | |
| 40,000 | .001333 | .000233 | ..... | ..... | |
| 50,000 | .001667 | .000334 | ..... | ..... | |
| 60,000 | .002033 | .000366 | ..... | ..... | |
| 61,000 | .002067 | .000034 | ..... | ..... | |
| 62,000 | .002100 | .000033 | ..... | ..... | |
| 63,000 | .002133 | .000033 | ..... | ..... | |
| 64,000 | .002167 | .000034 | ..... | ..... | |
| 65,000 | .002200 | .000033 | ..... | ..... | |
| 66,000 | .002267 | .000067 | ..... | ..... | Elastic limit. |
| 67,000 | .016167 | .013900 | ..... | ..... | |
| 68,000 | .016500 | .000433 | ..... | ..... | |
| 69,000 | .016800 | .000300 | ..... | ..... | |
| 70,000 | .017433 | .000633 | ..... | ..... | |
| 72,000 | .019833 | .002400 | ..... | ..... | |
| 76,000 | .021667 | .001834 | ..... | ..... | |
| 80,000 | .025500 | .003833 | ..... | ..... | |
| 84,000 | .029333 | .003833 | ..... | ..... | |
| 88,000 | .030333 | .001000 | ..... | ..... | |
| 92,000 | .039433 | .009100 | ..... | ..... | |
| 96,000 | .046833 | .007400 | ..... | ..... | |
| 108,800 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 108,800 |
| Elastic limit per square inch of original section | do... | 66,000 |
| Elongation per inch after rupture | inch.. | .2083 |
| Elongation per inch under strain at elastic limit | do... | .002267 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | ".90 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ".37*, ".14, ".10 |

## No. 6471.

From breech end of barrel too hard to drill, annealed at low heat in lime.

Marks, S 5.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".
Same metal as No. 6470.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000267 | .000200 | ..... | ..... | |
| 20,000 | .000600 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000367 | ..... | ..... | |
| 35,000 | .001100 | .000133 | ..... | ..... | |
| 40,000 | .001300 | .000200 | ..... | ..... | |
| 42,000 | .001367 | .000067 | ..... | ..... | |
| 44,000 | .001433 | .000066 | ..... | ..... | |
| 46,000 | .001500 | .000067 | ..... | ..... | |
| 48,000 | .001567 | .000067 | ..... | ..... | |
| 49,000 | .001633 | .000066 | ..... | ..... | Elastic limit. |
| 50,000 | .002833 | .001200 | ..... | ..... | |
| 51,000 | .005367 | .002534 | ..... | ..... | |
| 52,000 | .006333 | .000966 | ..... | ..... | |
| 53,000 | .006400 | .000067 | ..... | ..... | |
| 54,000 | .006767 | .000367 | ..... | ..... | |
| 56,000 | .008000 | .001233 | ..... | ..... | |
| 58,000 | .008633 | .000633 | ..... | ..... | |
| 60,000 | .010000 | .001367 | ..... | ..... | |
| 64,000 | .012500 | .002500 | ..... | ..... | |
| 68,000 | .014667 | .002167 | ..... | ..... | |
| 72,000 | .017500 | .002833 | ..... | ..... | |
| 76,000 | .020167 | .002667 | ..... | ..... | |
| 80,000 | .023333 | .003166 | ..... | ..... | |
| 84,000 | .027333 | .004000 | ..... | ..... | |
| 88,000 | .031333 | .004000 | ..... | ..... | |
| 92,000 | .036500 | .005167 | ..... | ..... | |
| 96,000 | .041667 | .005167 | ..... | ..... | |
| 109,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 109,450 |
| Elastic limit per square inch of original section | do... | 49,000 |
| Elongation per inch after rupture | inch.. | .1733 |
| Elongation per inch under strain at elastic limit | do... | .001633 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | 1".45 from neck |
| Character of broken surface | | fine granular 50 per cent, silky 50 per cent |
| Elongation of inch sections | | ".14, ".26, ".12 |

## No. 6472.

From breech of barrel, heated to about 1,350° and annealed in charcoal.

Marks, S 2.

Diameter, ".505.

Sectional area, .20 square inch.

Gauged length, 3".

Same metal as No. 6470.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000167 | .000167 | 0. | ..... | |
| 10,000 | .000333 | .000166 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 35,000 | .001200 | .000200 | ..... | ..... | |
| 40,000 | .001367 | .000167 | ..... | ..... | |
| 50,000 | .001700 | .000333 | ..... | ..... | |
| 51,000 | .001733 | .000033 | ..... | ..... | |
| 52,000 | .001800 | .000067 | ..... | ..... | |
| 53,000 | .001833 | .000033 | ..... | ..... | |
| 54,000 | .001867 | .000034 | ..... | ..... | |
| 55,000 | .001900 | .000033 | ..... | ..... | |
| 56,000 | .001967 | .000067 | ..... | ..... | Elastic limit. |
| 57,000 | .002167 | .000200 | ..... | ..... | |
| | .002533 | .000366 | ..... | ..... | |
| 58,000 | .002900 | .000367 | ..... | ..... | |
| 59,000 | .003167 | .000267 | ..... | ..... | |
| 60,000 | .003433 | .000266 | ..... | ..... | |
| 64,000 | .006167 | .002734 | ..... | ..... | |
| 68,000 | .007500 | .001333 | ..... | ..... | |
| 72,000 | .009667 | .002167 | ..... | ..... | |
| 76,000 | .011567 | .001900 | ..... | ..... | |
| 80,000 | .013767 | .002200 | ..... | ..... | |
| 84,000 | .016333 | .002566 | ..... | ..... | |
| 88,000 | .018600 | .002267 | ..... | ..... | |
| 92,000 | .021000 | .002400 | ..... | ..... | |
| 96,000 | .023667 | .002667 | ..... | ..... | |
| 100,000 | .027333 | .003666 | ..... | ..... | |
| 104,000 | .030500 | .003167 | ..... | ..... | |
| 125,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 125,450 |
| Elastic limit per square inch of original section | do... | 56,000 |
| Elongation per inch after rupture | inch.. | .1238 |
| Elongation per inch under strain at elastic limit | do... | .001967 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | ".85 from neck |
| Character of broken surface | | fine granular, with dull center |
| Elongation of inch sections | | ".19", ".10, ".08 |

## No. 6503.

Marks, 2.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".
Samples marked 2 to 6 inclusive taken from a lot of bars furnished by the steel makers.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001633 | .000333 | 0. | ..... | |
| 60,000 | .002000 | .000367 | ..... | ..... | |
| 67,000 | .002267 | .000267 | ..... | ..... | |
| 68,000 | .002300 | .000033 | ..... | ..... | Elastic limit. |
| 69,000 | .007100 | .004800 | ..... | ..... | |
| 70,000 | .007600 | .000500 | ..... | ..... | |
| 71,000 | .008000 | .000400 | ..... | ..... | |
| 72,000 | .008900 | .000900 | ..... | ..... | |
| 74,000 | .009767 | .000867 | ..... | ..... | |
| 76,000 | .011300 | .001533 | ..... | ..... | |
| 80,000 | .013667 | .002367 | ..... | ..... | |
| 84,000 | [illegible] | .002833 | ..... | ..... | |
| 88,000 | .020000 | .003500 | ..... | ..... | |
| 92,000 | .022833 | .002833 | ..... | ..... | |
| 96,000 | .026500 | .003667 | ..... | ..... | |
| 100,000 | .030833 | .004333 | ..... | ..... | |
| 104,000 | .034333 | .003500 | ..... | ..... | |
| 108,000 | .040000 | .005667 | ..... | ..... | |
| 112,000 | .048833 | .008833 | ..... | ..... | |
| 121,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 121,400 |
| Elastic limit per square inch of original section | do... | 68,000 |
| Elongation per inch after rupture | inch.. | .1867 |
| Elongation per inch under strain at elastic limit | do... | .002300 |
| Reduction in diameter at point of rupture | do.. | .155 |
| Reduction in area after rupture, per cent of original section | | 51 9 |
| Position of rupture | | 1".6 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ".11, ".34*, ".11 |

## No. 6504.

Marks, 3.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | ..... | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | ..... | ..... | |
| 60,000 | .002033 | .000366 | ..... | ..... | |
| 70,000 | .002400 | .000367 | ..... | ..... | |
| 71,000 | .002467 | .000067 | ..... | ..... | |
| 72,000 | .002500 | .000033 | ..... | ..... | Elastic limit. |
| 73,000 | .009000 | .006500 | ..... | ..... | |
| 74,000 | .009433 | .000433 | ..... | ..... | |
| 75,000 | .009933 | .000500 | ..... | ..... | |
| 76,000 | .010667 | .000734 | ..... | ..... | |
| 80,000 | .013167 | .002500 | ..... | ..... | |
| 84,000 | .016267 | .003100 | ..... | ..... | |
| 88,000 | .018900 | .002633 | ..... | ..... | |
| 92,000 | .022100 | .003200 | ..... | ..... | |
| 96,000 | .026000 | .003900 | ..... | ..... | |
| 100,000 | .029333 | .003333 | ..... | ..... | |
| 104,000 | .033900 | .004567 | ..... | ..... | |
| 108,000 | .038667 | .004767 | ..... | ..... | |
| 112,000 | .045833 | .007166 | ..... | ..... | |
| 122,850 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 122,850 |
| Elastic limit per square inch of original section | do... | 72,000 |
| Elongation per inch after rupture | inch.. | .1867 |
| Elongation per inch under strain at elastic limit | do... | .002500 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1″.6 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ″.11, ″.33*, ″.12 |

## No. 6505.

Marks, 4.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | 000633 | .000333 | ..... | ..... | |
| 30,000 | 000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001633 | .000333 | 0. | ..... | |
| 60,000 | 001967 | 000334 | ..... | ..... | |
| 65,000 | 002167 | .000200 | ..... | ..... | |
| 66,000 | .002200 | 000033 | ..... | ..... | |
| 67,000 | .002233 | .000033 | ..... | ..... | Elastic limit. |
| 68,000 | .008333 | 006100 | ..... | ..... | |
| 69,000 | .008667 | .000334 | ..... | ..... | |
| 70,000 | .009000 | .000333 | ..... | ..... | |
| 72,000 | .010333 | .001333 | ..... | ..... | |
| 74,000 | .011400 | .001067 | ..... | ..... | |
| 76,000 | .012733 | .001333 | ..... | ..... | |
| 80,000 | .015667 | .002934 | ..... | ..... | |
| 84,000 | 018667 | .003000 | ..... | ..... | |
| 88,000 | .021767 | .003100 | ..... | ..... | |
| 92,000 | 025733 | .003966 | ..... | ..... | |
| 96,000 | .028933 | .003200 | ..... | ..... | |
| 100,000 | 034333 | 005400 | ..... | ..... | |
| 104,000 | .039333 | .005000 | ..... | ..... | |
| 108,000 | 046433 | 007100 | ..... | ..... | |
| 112,000 | .056167 | .009734 | ..... | ..... | |
| 119,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 119,600 |
| Elastic limit per square inch of original section | do... | 67,000 |
| Elongation per inch after rupture | inch.. | .1833 |
| Elongation per inch under strain at elastic limit | do... | .002233 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | 1".55 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ".12, ".31*, ".12 |

## No. 6506.

Marks, 5.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002033 | .000366 | ..... | ..... | |
| 65,000 | .002267 | .000234 | ..... | ..... | |
| 66,000 | .002300 | .000033 | ..... | ..... | |
| 67,000 | .002367 | .000067 | ..... | ..... | Elastic limit. |
| 68,000 | .003867 | .001500 | ..... | ..... | |
| 69,000 | .006000 | .002133 | ..... | ..... | |
| 70,000 | .006667 | .000667 | ..... | ..... | |
| 72,000 | .007633 | .000966 | ..... | ..... | |
| 76,000 | .010000 | .002367 | ..... | ..... | |
| 80,000 | .012667 | .002667 | ..... | ..... | |
| 84,000 | .015033 | .002366 | ..... | ..... | |
| 88,000 | .018000 | .002967 | ..... | ..... | |
| 92,000 | .020733 | .002733 | ..... | ..... | |
| 96,000 | .024100 | .003367 | ..... | ..... | |
| 100,000 | .027567 | .003467 | ..... | ..... | |
| 104,000 | .031333 | .003766 | ..... | ..... | |
| 108,000 | .035667 | .004334 | ..... | ..... | |
| 112,000 | .041833 | .006166 | ..... | ..... | |
| 124,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 124,550 |
| Elastic limit per square inch of original section | do... | 67,000 |
| Elongation per inch after rupture | inch.. | .1733 |
| Elongation per inch under strain at elastic limit | do... | .002367 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ",10, ",32*, ",10 |

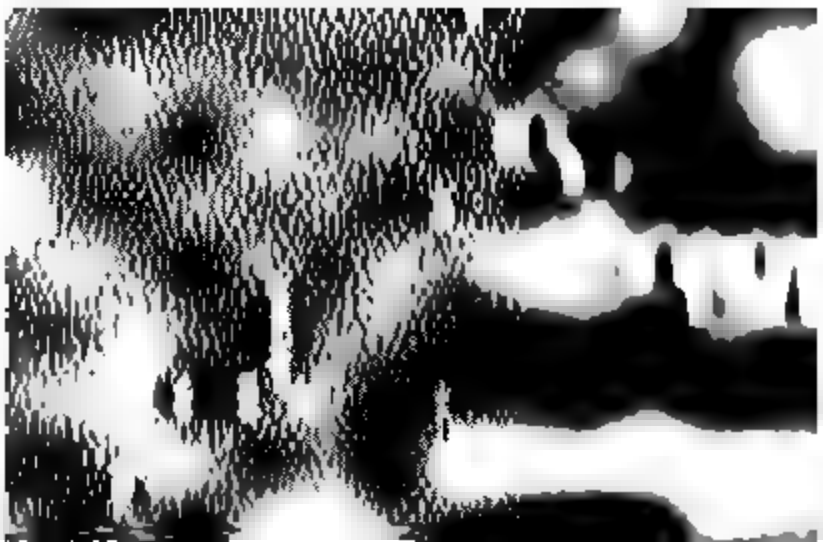
## No. 6507.

**Marks, 6.**
**Diameter, ".505.**
**Sectional area, .20 square inch.**
**Gauged length, 3".**

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | 000100 | 0. | ..... | |
| 10,000 | .000800 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000533 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 66,000 | .002233 | .000233 | ..... | ..... | |
| 67,000 | .002300 | 000067 | ..... | ..... | Elastic limit. |
| 68,000 | .007000 | .004700 | ..... | ..... | |
| 69,000 | .007600 | .000600 | ..... | ..... | |
| 70,000 | .007967 | .000367 | ..... | ..... | |
| 72,000 | .009400 | .001433 | ..... | ..... | |
| 76,000 | .012333 | .002933 | ..... | ..... | |
| 80,000 | .015100 | .002767 | ..... | ..... | |
| 84,000 | .018000 | .002900 | ..... | ..... | |
| 88,000 | .021167 | .003167 | ..... | ..... | |
| 92,000 | .025000 | .003833 | ..... | ..... | |
| 96,000 | .029967 | .003967 | ..... | ..... | |
| 100,000 | .033000 | .004033 | ..... | ..... | |
| 104,000 | .039167 | .006167 | ..... | ..... | |
| 108,000 | .045667 | .006500 | ..... | ..... | |
| 112,000 | .056000 | .010333 | ..... | ..... | |
| 118,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 118,550 |
| Elastic limit per square inch of original section | do... | 67,000 |
| Elongation per inch after rupture | inch.. | .1867 |
| Elongation per inch under strain at elastic limit | do... | .002300 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51 9 |
| Position of rupture | | 1".3 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ".10, ".28*, ".13 |



## No. 6519.

From rolled barrel.
Marks, 2 R. Blue ends.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001367 | .000367 | ..... | ..... | |
| 50,000 | .001700 | .000333 | 0. | ..... | |
| 60,000 | .002033 | .000333 | ..... | ..... | |
| 62,000 | .002067 | .000034 | ..... | ..... | |
| 63,000 | .002100 | .000033 | ..... | ..... | |
| 64,000 | .002167 | .000067 | ..... | ..... | Elastic limit. |
| 65,000 | .014400 | .002233 | ..... | ..... | |
| 66,000 | .015333 | .000933 | ..... | ..... | |
| 68,000 | .016500 | .001167 | ..... | ..... | |
| 70,000 | .018667 | .002167 | ..... | ..... | |
| 72,000 | .020233 | .001566 | ..... | ..... | |
| 76,000 | .024000 | .003767 | ..... | ..... | |
| 80,000 | .028333 | .004333 | ..... | ..... | |
| 84,000 | .030333 | .002000 | ..... | ..... | |
| 88,000 | .039000 | .008667 | ..... | ..... | |
| 92,000 | .047000 | .008000 | ..... | ..... | |
| 96,000 | .057667 | .010667 | ..... | ..... | |
| 104,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 104,550 |
| Elastic limit per square inch of original section | do... | 64,000 |
| Elongation per inch after rupture | inch.. | .1833 |
| Elongation per inch under strain at elastic limit | do... | .002167 |
| Reduction in diameter at point of rupture | do... | .175 |
| Reduction in area after rupture, per cent of original section | | 57.2 |
| Position of rupture | | ".65 from neck |
| Character of broken surface | | fine silky, serrated edges, cup shaped |
| Elongation of inch sections | | ".37*, ".10, ".08 |

## No. 6520.

From rolled barrel.
Marks, 3 R. Yellow ends.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | |
| 5,000 | .000100 | .000100 | 0. | ..... | Initial load. |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 64,000 | .002133 | .000133 | ..... | ..... | |
| 66,000 | .002167 | .000034 | ..... | ..... | |
| 66,000 | .002233 | .000066 | ..... | ..... | Elastic limit. |
| | .011833 | .009600 | ..... | ..... | |
| 67,000 | .012167 | .000334 | ..... | ..... | |
| 68,000 | .012400 | .000233 | ..... | ..... | |
| 70,000 | .015733 | .001333 | ..... | ..... | |
| 72,000 | .016000 | .001267 | ..... | ..... | |
| 76,000 | .018333 | .002333 | ..... | ..... | |
| 80,000 | .021333 | .003000 | ..... | ..... | |
| 84,000 | .025000 | .003667 | ..... | ..... | |
| 88,000 | .029000 | .004000 | ..... | ..... | |
| 92,000 | .034000 | .005000 | ..... | ..... | |
| 96,000 | .039667 | .005667 | ..... | ..... | |
| 100,000 | .046667 | .007000 | ..... | ..... | |
| | | | | ..... | Tensile strength. |

*mary.*

| | | |
|---|---|---|
| ..... | .....pounds.. | 111,400 |
| ..... | .....do... | 66,000 |
| ..... | .....inch.. | 1767 |
| ..... | .....do.... | .002233 |
| ..... | .....do... | .165 |
| ction..... | ..... | 54.6 |
| ..... | ..... | ".7 from neck |
| ..... | ..... | fine silky, cup shaped |
| ... | ..... | ".08, ".11, ".34" |

No. 6521.

From rolled barrel.
Marks, 4 R. White ends.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds | 107,560 |
| Elastic limit per square inch of original section | do | 68,000 |
| Elongation per inch after rupture | inch | .2167 |
| Elongation per inch under strain at elastic limit | do | .002133 |
| Reduction in diameter at point of rupture | do | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | 1" 2 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".12, ".21, ".32 |

## No. 6522.

From rolled barrel.
Marks, 5 R. Orange ends.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 65,000 | .002167 | .000167 | ..... | ..... | |
| 66,000 | .002200 | .000033 | ..... | ..... | |
| 67,000 | .002267 | .000067 | ..... | ..... | Elastic limit. |
| | .012067 | .009800 | ..... | ..... | |
| 68,000 | .012833 | .000766 | ..... | ..... | |
| 70,000 | .013700 | .000867 | ..... | ..... | |
| 72,000 | .015167 | .001467 | ..... | ..... | |
| 76,000 | .018000 | .002833 | ..... | ..... | |
| 80,000 | .021333 | .003333 | ..... | ..... | |
| 84,000 | .024833 | .003500 | ..... | ..... | |
| 88,000 | .028667 | .003834 | ..... | ..... | |
| 92,000 | .033333 | .004666 | ..... | ..... | |
| 96,000 | .039000 | .005667 | ..... | ..... | |
| 100,000 | .045667 | .006667 | ..... | ..... | |
| 112,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 112,000 |
| Elastic limit per square inch of original section | do... | 67,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do... | .002267 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | ″.85 from neck |
| Character of broken surface | | fine silky, serrated edges, cup shaped |
| Elongation of inch sections | | ″.37*, ″.13, ″.10 |

## No. 6523.

From rolled barrel.
Marks, 6 R. Black ends.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000133 | .000133 | 0. | ..... | |
| 10,000 | .000333 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002033 | .000366 | ..... | ..... | |
| 65,000 | .002233 | .000200 | ..... | ..... | |
| 66,000 | .002300 | .000067 | ..... | ..... | Elastic limit. |
| 67,000 | .016000 | .003700 | ..... | ..... | |
| 68,000 | .017000 | .001000 | ..... | ..... | |
| 70,000 | .018500 | .001500 | ..... | ..... | |
| 72,000 | .020333 | .001833 | ..... | ..... | |
| 76,000 | .024433 | .004100 | ..... | ..... | |
| 80,000 | .028767 | .004334 | ..... | ..... | |
| 84,000 | .034000 | .005233 | ..... | ..... | |
| 88,000 | .040000 | .006000 | ..... | ..... | |
| 92,000 | .047667 | .007667 | ..... | ..... | |
| 104,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 104,900 |
| Elastic limit per square inch of original section | do... | 66,000 |
| Elongation per inch after rupture | inch.. | .2067 |
| Elongation per inch under strain at elastic limit | do... | .002300 |
| Reduction in diameter at point of rupture | do... | .175 |
| Reduction in area after rupture, per cent of original section | | 57.2 |
| Position of rupture | | ".75 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".39, ".12, ".10 |

No. 6720.

Marks, S. J. B.—Blank.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000800 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000833 | ..... | ..... | |
| 30,000 | .001000 | .000867 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002367 | .000367 | ..... | ..... | |
| 75,000 | .002600 | .000233 | ..... | ..... | |
| 77,000 | .002700 | .000100 | ..... | ..... | Elastic limit |
| 78,000 | .004167 | .001467 | ..... | ..... | |
| 79,000 | .007333 | .003166 | ..... | ..... | |
| 80,000 | .010333 | .003000 | ..... | ..... | |
| 84,000 | .020167 | .009834 | ..... | ..... | |
| 88,000 | .029167 | .009000 | ..... | ..... | |
| 92,000 | .040333 | .011166 | ..... | ..... | |
| 96,000 | .057333 | .017000 | ..... | ..... | |
| 100,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 100,900 |
| Elastic limit per square inch of original section | do... | 77,000 |
| Elongation per inch after rupture | inch.. | .1933 |
| Elongation per inch under strain at elastic limit | do... | .002700 |
| Reduction in diameter at point of rupture | do... | .195 |
| Reduction in area after rupture, per cent of original section | | 62.2 |
| Position of rupture | | " 95 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".39*, ".11, ".06 |

## No. 6754.

From barrel oil tempered at butt.
Marks, $\frac{S\ J\ B}{O\ T}$
Sectional area, .25 square inch.
Gauged length, 1″.
From the same lot of blanks as No. 6720.

| Pounds. | Inch. | Inch. | Inch. | Inch. | Remarks. |
|---|---|---|---|---|---|
| 0 | 0. | 0. | [illegible] | [illegible] | Initial load. |
| 0 | .0001 | .0001 | 0. | | |
| 0 | .0004 | .0003 | | | |
| 0 | .0007 | .0003 | | | |
| 0 | .0010 | .0003 | | | |
| 0 | [illegible] | .0003 | | | |
| 0 | .0017 | .0004 | | | |
| 0 | .0021 | .0004 | | | |
| 0 | .0024 | .0003 | 0. | | |
| 0 | .0027 | .0003 | | | |
| 0 | .0030 | .0003 | | | |
| 0 | .0034 | .0004 | | | |
| 0 | .0036 | .0002 | | | |
| 0 | .0041 | .0005 | .0004 | .0004 | Elastic limit. |
| 0 | .0043 | .0002 | | | |
| 0 | .0046 | .0003 | | | |
| 113,000 | .0048 | .0002 | | | |
| 114,000 | .0053 | .0005 | | | |
| 126,880 | | | | | |
| [1] | | | | | |
| 0. | .01 | | | | Present elongation. |
| [2] | | | | | |
| 135,920 | | | | | Tensile strength. |

[1] Test discontinued. Stripped threads in holder dies.
[2] New holder dies made and test completed.

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds | 135,920 |
| Elastic limit per square inch of original section | do | 110,000 |
| Elongation per inch after rupture | inch | .09 |
| Elongation per inch under strain at elastic limit | do | .0041 |
| Character of broken surface | | silky, cup shaped |

## No. 6755.

From barrel oil tempered at butt.
Marks, $\overset{S\ J\ B}{O\ T}$
Sectional area, .25 square inch.
Gauged length, 1″.
From the same lot of blanks as No. 6720.

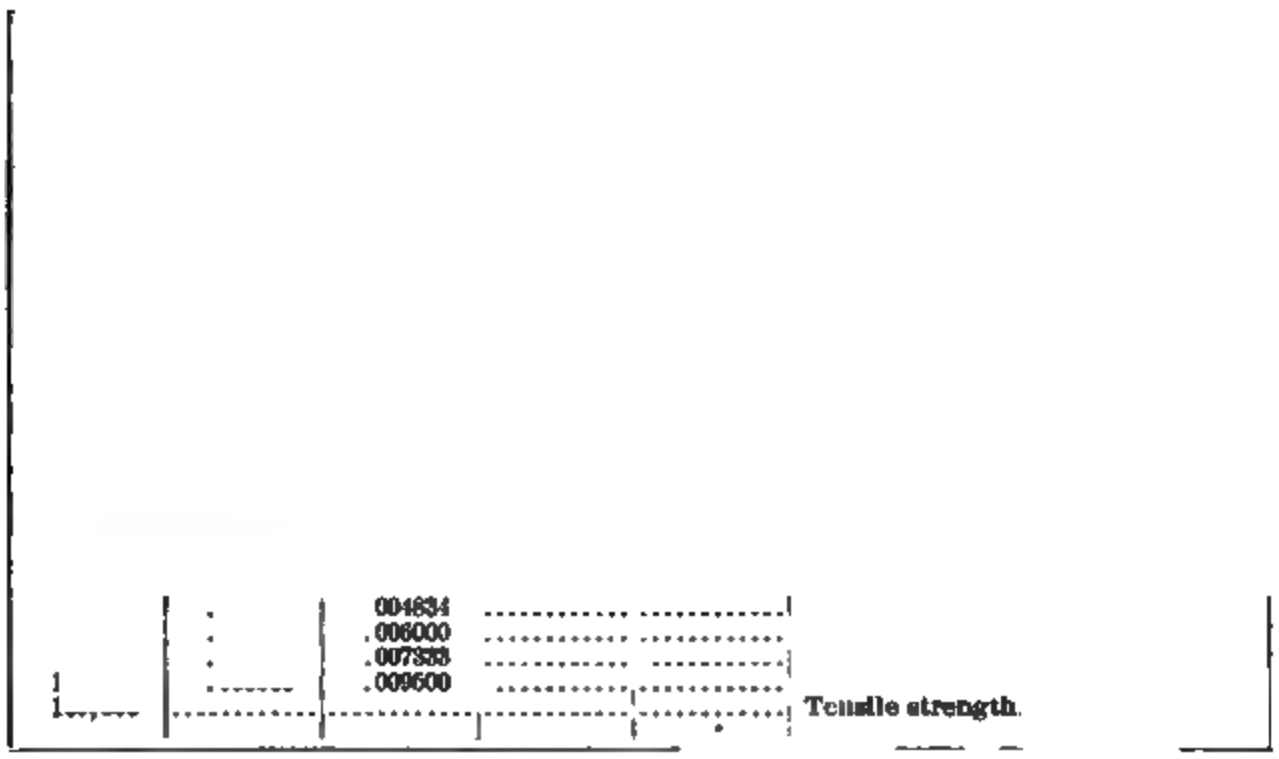
| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .0001 | .0001 | 0. | ..... | |
| 10,000 | .0003 | [illegible] | ..... | ..... | |
| 20,000 | .0006 | .0003 | ..... | ..... | |
| 30,000 | .0010 | 0004 | 0. | ..... | |
| 40,000 | .0013 | .0003 | ..... | ..... | |
| 50,000 | .0017 | 0004 | ..... | ..... | |
| 60,000 | .0021 | .0004 | ..... | ..... | |
| 70,000 | .0024 | 0003 | 0. | ..... | |
| 78,000 | [illegible] | .0005 | ..... | ..... | |
| 79,000 | [illegible] | 0001 | ..... | ..... | Elastic limit. |
| 80,000 | .0034 | .0004 | ..... | ..... | |
| 81,000 | .0039 | .0005 | ..... | ..... | |
| 82,000 | .0054 | .0015 | ..... | ..... | |
| 83,000 | .0065 | .0011 | ..... | ..... | |
| 84,000 | .0084 | .0021 | ..... | ..... | |
| 85,000 | .0117 | .0033 | ..... | ..... | |
| 86,000 | .0138 | .0021 | ..... | ..... | |
| 88,000 | .0188 | .0050 | ..... | ..... | |
| 92,000 | .0270 | .0082 | ..... | ..... | |
| 96,000 | .04 | .013 | ..... | ..... | |
| 100,000 | .06 | .02 | ..... | ..... | |
| 104,000 | .09 | .03 | ..... | ..... | |
| 104,960 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds... | 104,960 |
| Elastic limit per square inch of original section | do... | 79,000 |
| Elongation per inch after rupture | inch.. | .26 |
| Elongation per inch under strain at elastic limit | do... | .0030 |
| Reduction in diameter at point of rupture (exterior) | do... | .1108 |
| Character of broken surface | | silky, cup shaped |

No. 6735.

Marks, S & J.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".
Specimen from a blank received from the steel maker.




*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 109,000 |
| Elastic limit per square inch of original section | do.... | 66,000 |
| Elongation per inch after rupture | inch.. | .1933 |
| Elongation per inch under strain at elastic limit | do.... | .002233 |
| Reduction in diameter at point of rupture | do.... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | ".9 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".11, ".13, ".34" |

## SPECIMENS FROM TWO BARRELS, OIL TEMPERED AT A LOW HEAT ALONG THE LENGTH OF POWDER CHAMBER.

### No. 6609.

From middle of length of barrel untreated part.
Marks, S (1).
Exterior diameter, ".4662.
Interior diameter, ".3000.
Sectional area, .10 square inch.
Gauged length, 3".
From the same barrel as No. 9678.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001367 | .000367 | 0. | ..... | |
| 47,000 | .001667 | .000300 | ..... | ..... | |
| 48,000 | .001733 | .000066 | ..... | ..... | Elastic limit. |
| 49,000 | .002733 | .001000 | ..... | ..... | |
| 50,000 | .003000 | .000267 | ..... | ..... | |
| 51,000 | .003333 | .000333 | ..... | ..... | |
| 52,000 | .003700 | .000367 | ..... | ..... | |
| 54,000 | .004500 | .000800 | ..... | ..... | |
| 56,000 | .005333 | .000833 | ..... | ..... | |
| 58,000 | .006333 | .001000 | ..... | ..... | |
| 60,000 | .007333 | .001000 | ..... | ..... | |
| 64,000 | .009667 | .002334 | ..... | ..... | |
| 68,000 | .012000 | .002333 | ..... | ..... | |
| 72,000 | .014400 | .002400 | ..... | ..... | |
| 76,000 | .017333 | .002933 | ..... | ..... | |
| 80,000 | .020000 | .002667 | ..... | ..... | |
| 84,000 | .023000 | .003000 | ..... | ..... | |
| 88,000 | .026333 | .003333 | ..... | ..... | |
| 92,000 | .030500 | .004167 | ..... | ..... | |
| 96,000 | .035000 | .004500 | ..... | ..... | |
| 100,000 | .042000 | .007000 | ..... | ..... | |
| 113,200 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 113,200 |
| Elastic limit per square inch of original section | do... | 48,000 |
| Elongation per inch after rupture | inch.. | .1167 |
| Elongation per inch under strain at elastic limit | do... | .001733 |
| Reduction in diameter at point of rupture (exterior) | do... | .0462 |
| Position of rupture | | ".5 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ".17", ".09, ".09 |

## No. 6610.

From middle of length of barrel, untreated part.
Marks, S (2).
Exterior diameter, ".4662.
Interior diameter, ".3000.
Sectional area, .10 square inch.
Gauged length, 3".
From the same barrel as No. 9679.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001367 | .000367 | 0. | ..... | |
| 45,000 | .001567 | .000200 | ..... | ..... | |
| 46,000 | .001667 | .000200 | ..... | ..... | |
| 47,000 | .001700 | .000033 | .000067 | .000067 | |
| 48,000 | .001767 | .000067 | ..... | ..... | Elastic limit. |
| 49,000 | .002067 | .000300 | ..... | ..... | |
| 50,000 | .003333 | .001266 | ..... | ..... | |
| 51,000 | .004833 | .001500 | ..... | ..... | |
| 52,000 | .005333 | .000500 | ..... | ..... | |
| 54,000 | .006500 | .001167 | ..... | ..... | |
| 56,000 | .007667 | .001167 | ..... | ..... | |
| 60,000 | .010100 | .002433 | ..... | ..... | |
| 64,000 | .012333 | .002233 | ..... | ..... | |
| 68,000 | .015000 | .002667 | ..... | ..... | |
| 72,000 | .017667 | .002667 | ..... | ..... | |
| 76,000 | .021000 | .003333 | ..... | ..... | |
| 80,000 | .024500 | .003500 | ..... | ..... | |
| 84,000 | .028667 | .004167 | ..... | ..... | |
| 88,000 | .032667 | .004000 | ..... | ..... | |
| 92,000 | .038333 | .005666 | ..... | ..... | |
| 96,000 | .045667 | .007334 | ..... | ..... | |
| 100,000 | .056000 | .010333 | ..... | ..... | |
| 107,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 107,000 |
| Elastic limit per square inch of original section | do... | 48,000 |
| Elongation per inch after rupture | inch.. | .1333 |
| Elongation per inch under strain at elastic limit | do... | .001767 |
| Reduction in diameter at point of rupture (exterior) | do... | .0762 |
| Position of rupture | | ".6 from neck |
| Character of broken surface | | fine granular |
| Elongation of inch sections | | ".20*, ".11, ".09 |

No. 6579.

From middle of length of barrel.
Marks, S . . .
Exterior diameter, ".4662.
Interior diameter, ".3000.
Sectional area, .10 square inch.
Gauged length, 3".
From the same barrel as No. 9680.

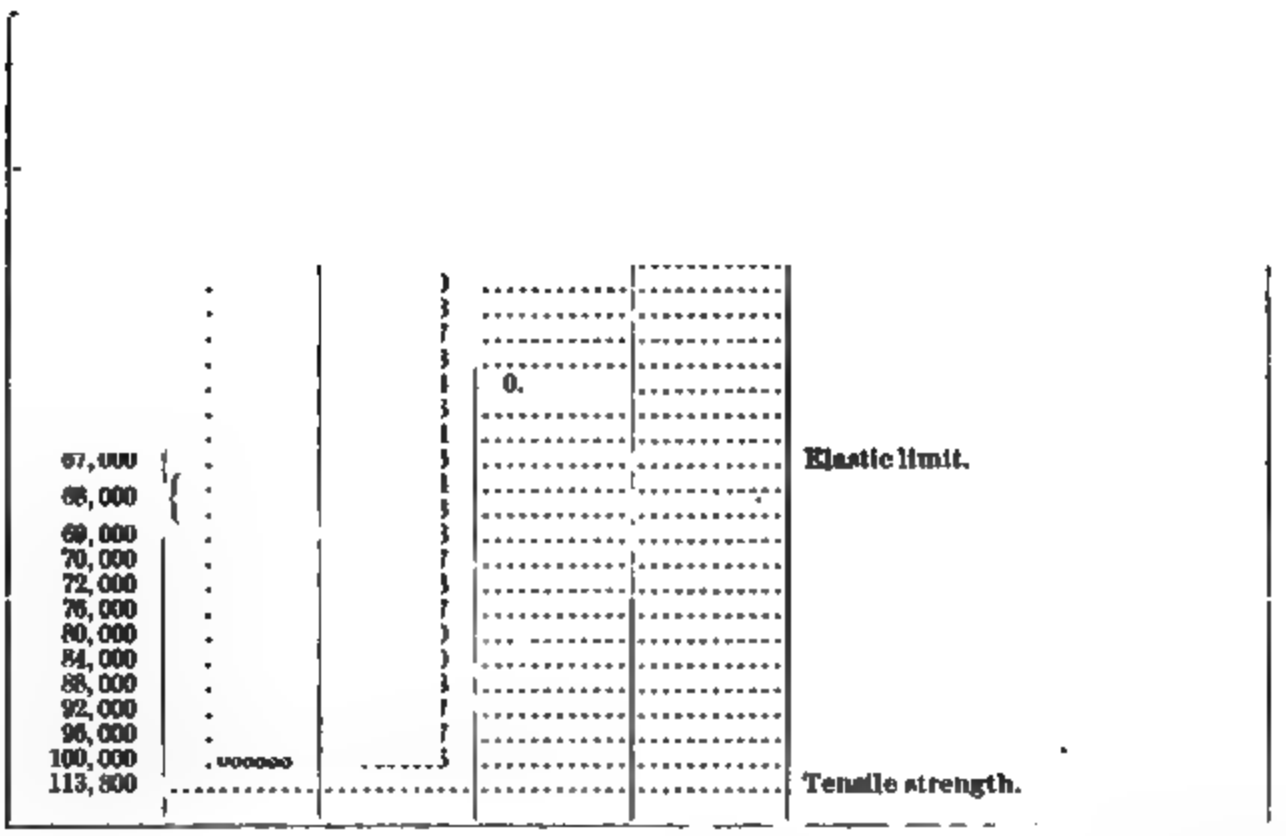
| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 114,400 |
| Elastic limit per square inch of original section | do.... | 68,000 |
| Elongation per inch after rupture | inch.. | .1667 |
| Elongation per inch under strain at elastic limit | do.... | .002333 |
| Reduction in diameter at point of rupture (exterior) | do.... | .1062 |
| Position of rupture | | 1".6 from neck |
| Character of broken surface | | silky, cup shaped |
| Elongation of inch sections | | ".11, ".27*, ".12 |

No. 6579*a*.

From muzzle end of barrel.
Marks, S . . .
Exterior diameter, ".4662.
Interior diameter, ".3000.
Sectional area, .10 square inch.
Gauged length, 3".
From the same barrel as No. 9680.




*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 113,800 |
| Elastic limit per square inch of original section | do... | 67,000 |
| Elongation per inch after rupture | inch.. | .1000 |
| Elongation per inch under strain at elastic limit | do... | .002388 |
| Reduction in diameter at point of rupture (exterior) | do... | .1052 |
| Position of rupture | | ".85 from neck |
| Character of broken surface | | silky, cup shaped |
| Elongation of inch sections | | ".22", ".07, ".03 |

No. 6580.

From middle of length of barrel.
Marks, S . . .
Exterior diameter, ".4662.
Interior diameter, ".3000.
Sectional area, .10 square inch.
Gauged length, 3".
From the same barrel as No. 9681.

| Applied loads per square inch. | Elongation per inch | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | [illegible] | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001700 | .000367 | 0. | ..... | |
| 60,000 | .002067 | .000367 | ..... | ..... | |
| 65,000 | .002267 | .000200 | ..... | ..... | |
| 66,000 | .002333 | .000066 | ..... | ..... | Elastic limit. |
| 67,000 | .010667 | .008334 | ..... | ..... | |
| 68,000 | .011667 | .001000 | ..... | ..... | |
| 70,000 | .012333 | .000666 | ..... | ..... | |
| 72,000 | .014000 | .001667 | ..... | ..... | |
| 76,000 | .017667 | [illegible] | ..... | ..... | |
| 80,000 | .020333 | .002666 | ..... | ..... | |
| 84,000 | .024000 | .003667 | ..... | ..... | |
| 88,000 | .028000 | .004000 | ..... | ..... | |
| 92,000 | .033000 | [illegible] | ..... | ..... | |
| 96,000 | .038333 | .005333 | ..... | ..... | |
| 100,000 | .045667 | .007334 | ..... | ..... | |
| 111,800 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 111,800 |
| Elastic limit per square inch of original section | do... | 66,000 |
| Elongation per inch after rupture | inch... | .1733 |
| Elongation per inch under strain at elastic limit | do... | .002333 |
| Reduction in diameter at point of rupture (exterior) | do... | .1162 |
| Position of rupture | | 1".4 from neck |
| Character of broken surface | | silky, cup shaped |
| Elongation of inch sections | | .12, .28, .12 |

## No. 6581.

From muzzle end of barrel.
Marks, S . . .
Exterior diameter, ".4662.
Interior diameter, ".3000.
Sectional area, .10 square inch.
Gauged length, 3".
From the same barrel as No. 9681.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002033 | .000366 | ..... | ..... | |
| 63,000 | .002133 | .000100 | ..... | ..... | |
| 64,000 | .002200 | .000067 | ..... | ..... | Elastic limit. |
| 65,000 | .003733 | .001533 | ..... | ..... | |
| 66,000 | .005933 | .002200 | ..... | ..... | |
| 68,000 | .006600 | .000667 | ..... | ..... | |
| 70,000 | .006900 | .000300 | ..... | ..... | |
| 72,000 | .007667 | .000767 | ..... | ..... | |
| 76,000 | .011000 | .003333 | ..... | ..... | |
| 80,000 | .016267 | .005267 | ..... | ..... | |
| 84,000 | .018333 | .002066 | ..... | ..... | |
| 88,000 | .022333 | .004000 | ..... | ..... | |
| 92,000 | .025667 | .003334 | ..... | ..... | |
| 96,000 | .030333 | .004666 | ..... | ..... | |
| 100,000 | .035500 | .005167 | ..... | ..... | |
| 112,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 112,000 |
| Elastic limit per square inch of original section | do... | 64,000 |
| Elongation per inch after rupture | inch.. | .1267 |
| Elongation per inch under strain at elastic limit | do... | .002200 |
| Reduction in diameter at point of rupture | do... | .1162 |
| Position of rupture | | 1".07 from neck |
| Character of broken surface | | silky, cup shaped |
| Elongation of inch sections | | ".08, ".11, ".24* |

## No. 6607.

Marks, H.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002400 | .000400 | ..... | ..... | Elastic limit. |
| 71,000 | .003333 | .000933 | ..... | ..... | |
| 72,000 | .004500 | .001167 | ..... | ..... | |
| 73,000 | .005133 | .000633 | ..... | ..... | |
| 74,000 | .005667 | .000534 | ..... | ..... | |
| 76,000 | .006833 | .001166 | ..... | ..... | |
| 80,000 | .009200 | .002367 | ..... | ..... | |
| 84,000 | .011733 | .002533 | ..... | ..... | |
| 88,000 | .014333 | .002600 | ..... | ..... | |
| 92,000 | .017000 | .002667 | ..... | ..... | |
| 96,000 | .019833 | .002833 | ..... | ..... | |
| 100,000 | .023333 | .003500 | ..... | ..... | |
| 104,000 | .026333 | .003000 | ..... | ..... | |
| 108,000 | .030500 | .004167 | ..... | ..... | |
| 112,000 | .034667 | .004167 | ..... | ..... | |
| 116,000 | .040000 | .005333 | ..... | ..... | |
| 120,000 | .047667 | .007667 | ..... | ..... | |
| 130,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 130,100 |
| Elastic limit per square inch of original section | do... | 70,000 |
| Elongation per inch after rupture | inch.. | .1600 |
| Elongation per inch under strain at elastic limit | do... | .002400 |
| Reduction in diameter at point of rupture | do... | .125 |
| Reduction in area after rupture, per cent of original section | | 43.3 |
| Position of rupture | | 1".5 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".11, ".27*, ".10 |

## No. 6725.

Hollow specimen from breech end of barrel.
Without oil tempering.
Marks, H. Same steel as 6607.
Sectional area, .25 square inch.
Gauged length, 1".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .0002 | .0002 | ..... | ..... | |
| 10,000 | .0004 | .0002 | ..... | ..... | |
| 20,000 | .0006 | .0002 | ..... | ..... | |
| 30,000 | .0010 | .0004 | ..... | ..... | |
| 40,000 | .0014 | .0004 | ..... | ..... | |
| 50,000 | .0019 | .0005 | ..... | ..... | |
| 60,000 | .0026 | .0007 | ..... | ..... | Elastic limit. |
| | .0030 | .0004 | ..... | ..... | |
| 61,000 | .0067 | .0037 | ..... | ..... | |
| 62,000 | .0079 | .0012 | ..... | ..... | |
| 64,000 | .0102 | .0023 | ..... | ..... | |
| 68,000 | .0122 | .0020 | ..... | ..... | |
| 72,000 | .0150 | .0028 | ..... | ..... | |
| 76,000 | .0180 | .0030 | ..... | ..... | |
| 80,000 | .0218 | .0038 | ..... | ..... | |
| 112,880 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 112,880 |
| Elastic limit per square inch of original section | do... | 60,000 |
| Elongation per inch after rupture | inch.. | .19 |
| Elongation per inch under strain at elastic limit | do... | .0026 |
| Reduction in diameter at point of rupture (exterior) | do... | .0508 |
| Character of broken surface | | silky 50 per cent, fine granular 50 per cent |

No. 6727.

Hollow specimen from breech end of barrel.
Oil tempered.
Marks, H O T. Same steel as 6607.
Sectional area, .25 square inch.
Gauged length, 1".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .0002 | .0002 | ..... | ..... | |
| 10,000 | .0004 | .0002 | ..... | ..... | |
| 20,000 | .0007 | .0003 | ..... | ..... | |
| 30,000 | .0010 | .0003 | ..... | ..... | |
| 40,000 | .0015 | .0005 | ..... | ..... | |
| 50,000 | .0018 | .0003 | ..... | ..... | |
| 60,000 | .0021 | .0003 | ..... | ..... | |
| 65,000 | .0023 | .0002 | ..... | ..... | |
| 66,000 | .0026 | .0003 | ..... | ..... | Elastic limit. |
| 67,000 | .0102 | .0076 | ..... | ..... | |
| 68,000 | .0140 | .0038 | ..... | ..... | |
| 70,000 | .0155 | .0015 | ..... | ..... | |
| 72,000 | .0167 | .0012 | ..... | ..... | |
| 74,000 | .0185 | .0018 | ..... | ..... | |
| 76,000 | .0200 | .0015 | ..... | ..... | |
| 80,000 | .0240 | .0040 | ..... | ..... | |
| 109,680 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

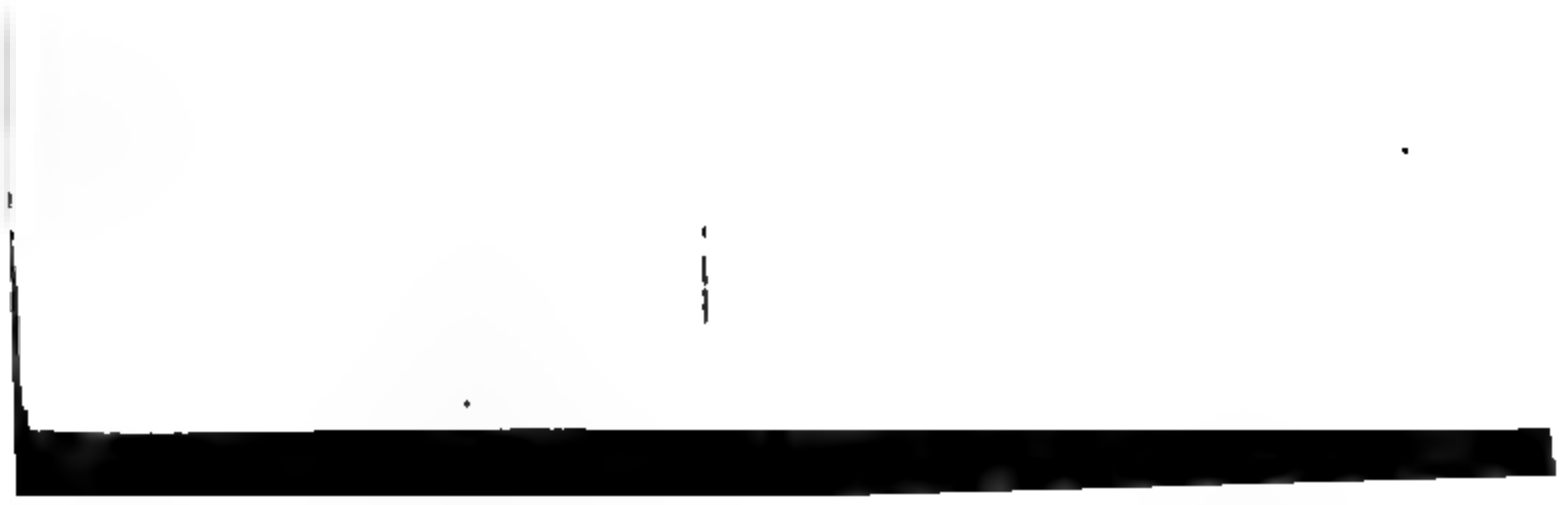
| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 109,680 |
| Elastic limit per square inch of original section | do... | 66,000 |
| Elongation per inch after rupture | inch.. | .24 |
| Elongation per inch under strain at elastic limit | do... | .0026 |
| Reduction in diameter at point of rupture (exterior) | do... | .0606 |
| Character of broken surface | | silky, cup shaped |

No. 6728.

Hollow specimen from breech end of barrel.
Oil tempered.
Marks, H O T. Same steel as 6607.
Sectional area, .25 square inch.
Gauged length, 1".

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 106,000 |
| Elastic limit per square inch of original section | do... | 61,000 |
| Elongation per inch after rupture | inch.. | .22 |
| Elongation per inch under strain at elastic limit | do... | .0021 |
| Reduction in diameter at point of rupture (exterior) | do... | .0508 |
| Character of broken surface | | silky, cup shaped |



No. 6733.

Marks, H.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000267 | .000200 | ..... | ..... | |
| 20,000 | .000600 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000367 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 67,000 | .002267 | .000267 | ..... | ..... | Elastic limit. |
| 68,000 | .002700 | .000433 | ..... | ..... | |
| 69,000 | .003133 | .000433 | ..... | ..... | |
| 70,000 | .004500 | .001367 | ..... | ..... | |
| 72,000 | .005900 | .001400 | ..... | ..... | |
| 76,000 | .008333 | .002433 | ..... | ..... | |
| 80,000 | .010600 | .002267 | ..... | ..... | |
| 84,000 | .013167 | .002567 | ..... | ..... | |
| 88,000 | .016333 | .003166 | ..... | ..... | |
| 92,000 | .019000 | .002667 | ..... | ..... | |
| 96,000 | .022000 | .003000 | ..... | ..... | |
| 100,000 | .025333 | .003333 | ..... | ..... | |
| 104,000 | .029000 | .003667 | ..... | ..... | |
| 108,000 | .033000 | .004000 | ..... | ..... | |
| 112,000 | .039000 | .006000 | ..... | ..... | |
| 127,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 127,000 |
| Elastic limit per square inch of original section | do... | 67,000 |
| Elongation per inch after rupture | inch.. | .1533 |
| Elongation per inch under strain at elastic limit | do... | .002267 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | #.8 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | #.09, #.10, #.27* |

## No. 6836.

**Marks, H 1.**
**Diameter, ".505.**
**Sectional area, .20 square inch.**
**Gauged length, 3".**

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001367 | .000367 | ..... | ..... | |
| 50,000 | .001700 | .000333 | 0. | ..... | |
| 60,000 | .002083 | .000383 | ..... | ..... | |
| 70,000 | .002400 | .000367 | ..... | ..... | Elastic limit. |
| 71,000 | .002583 | .000133 | ..... | ..... | |
| 72,000 | .004500 | .001967 | ..... | ..... | |
| 74,000 | .005333 | .000833 | ..... | ..... | |
| 76,000 | .006667 | .001334 | ..... | ..... | |
| 80,000 | .009000 | .002333 | ..... | ..... | |
| 84,000 | .011333 | .002333 | ..... | ..... | |
| 88,000 | .013500 | .002167 | ..... | ..... | |
| 92,000 | .016000 | .002500 | ..... | ..... | |
| 96,000 | .019000 | .003000 | ..... | ..... | |
| 100,000 | .021667 | .002667 | ..... | ..... | |
| 104,000 | .025000 | .003333 | ..... | ..... | |
| 131,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 131,100 |
| Elastic limit per square inch of original section | do... | 70,000 |
| Elongation per inch after rupture | inch.. | .1533 |
| Elongation per inch under strain at elastic limit | do... | .002400 |
| Reduction in diameter at point of rupture | do... | .125 |
| Reduction in area after rupture, per cent of original section | | 43.3 |
| Position of rupture | | ".9 from neck |
| Character of broken surface | | fine silky, cup shape |
| Elongation of inch sections | | ".26*, ".12, ".08 |

## No. 6838.

From rolled barrel at butt.
Marks, H 1 R B. Same steel as 6836.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000367 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002367 | .000367 | ..... | ..... | |
| 77,000 | .002633 | .000266 | ..... | ..... | |
| 78,000 | .002700 | .000067 | ..... | ..... | Elastic limit. |
| 79,000 | .002667 | .006967 | ..... | ..... | |
| 80,000 | .010333 | .000666 | ..... | ..... | |
| 84,000 | .012667 | .002334 | ..... | ..... | |
| 88,000 | .015333 | .002666 | ..... | ..... | |
| 92,000 | .018000 | .002667 | ..... | ..... | |
| 96,000 | .021000 | .003000 | ..... | ..... | |
| 100,000 | .024000 | .003000 | ..... | ..... | |
| 104,000 | .027667 | .003667 | ..... | ..... | |
| 108,000 | .031667 | .004000 | ..... | ..... | |
| 129,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 129,050 |
| Elastic limit per square inch of original section | do... | 78,000 |
| Elongation per inch after rupture | inch.. | .1667 |
| Elongation per inch under strain at elastic limit | do... | .002700 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | 1″.50 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ″.20, ″.21*, ″.09 |

## No. 6839.

From rolled barrel at butt, annealed.
Marks, H 1 R A B. Same steel as 6836.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 72,000 | .002400 | .000067 | ..... | ..... | Elastic limit. |
| | .016000 | .013600 | ..... | ..... | |
| 73,000 | .017000 | .001000 | ..... | ..... | |
| 74,000 | .018000 | .001000 | ..... | ..... | |
| 76,000 | .019833 | .001833 | ..... | ..... | |
| 80,000 | .023333 | .004000 | ..... | ..... | |
| 84,000 | .027333 | .004000 | ..... | ..... | |
| 88,000 | .032167 | .004834 | ..... | ..... | |
| 92,000 | .037667 | .005500 | ..... | ..... | |
| 96,000 | .044667 | .007000 | ..... | ..... | |
| 110,200 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 110,200 |
| Elastic limit per square inch of original section | do... | 72,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .002400 |
| Reduction in diameter at point of rupture | do... | .175 |
| Reduction in area after rupture, per cent of original section | | 57.2 |
| Position of rupture | | ".7 from neck |
| Character of broken surface | | fine silky, serrated |
| Elongation of inch sections | | ".09, ".11, ".37* |

## No. 6916.

Finished barrel, oil tempered.
Marks, $\frac{H}{O\ T.}$ Same steel as 6836.
Sectional area, .25 square inch.
Gauged length, 1″.
Specimen taken over powder chamber.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .0002 | .0002 | 0. | ..... | |
| 10,000 | .0004 | .0002 | ..... | ..... | |
| 20,000 | .0007 | .0003 | ..... | ..... | |
| 30,000 | .0010 | .0003 | ..... | ..... | |
| 40,000 | .0014 | .0004 | ..... | ..... | |
| 50,000 | .0018 | .0004 | 0. | ..... | |
| 60,000 | .0022 | .0004 | ..... | ..... | |
| 63,000 | .0024 | .0002 | ..... | ..... | Elastic limit. |
| 64,000 | .0075 | .0051 | ..... | ..... | |
| 65,000 | .0087 | .0012 | ..... | ..... | |
| 66,000 | .0110 | .0023 | ..... | ..... | |
| 68,000 | .0125 | .0015 | ..... | ..... | |
| 70,000 | .0140 | 0015 | ..... | ..... | |
| 72,000 | .0150 | .0010 | ..... | ..... | |
| 76,000 | .0180 | .0030 | ..... | ..... | |
| 80,000 | .0214 | .0034 | ..... | ..... | |
| 112,800 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

## No. 6623.

Marks, L.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".
From sample of barrel steel.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000367 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002033 | .000366 | ..... | ..... | |
| 66,000 | .002333 | .000300 | ..... | ..... | |
| 67,000 | .002400 | .000067 | ..... | ..... | Elastic limit. |
| 68,000 | .008000 | .005600 | ..... | ..... | |
| 69,000 | .008667 | .000667 | ..... | ..... | |
| 70,000 | .009167 | .000500 | ..... | ..... | |
| 72,000 | .010000 | .000833 | ..... | ..... | |
| 76,000 | .014000 | .004000 | ..... | ..... | |
| 80,000 | .016667 | .002667 | ..... | ..... | |
| 84,000 | .020000 | .003333 | ..... | ..... | |
| 88,000 | .023333 | .003333 | ..... | ..... | |
| 92,000 | .027167 | .003834 | ..... | ..... | |
| 96,000 | .031667 | .004500 | ..... | ..... | |
| 100,000 | .037000 | .005333 | ..... | ..... | |
| 104,000 | .043000 | .006000 | ..... | ..... | |
| 108,000 | .051000 | .008000 | ..... | ..... | |
| 117,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | ...pounds.. | 117,900 |
| Elastic limit per square inch of original section | ...do... | 67,000 |
| Elongation per inch after rupture | ...inch.. | .1700 |
| Elongation per inch under strain at elastic limit | ...do... | .002400 |
| Reduction in diameter at point of rupture | ...do... | .105 |
| Reduction in area after rupture, per cent of original section | | 37.1 |
| Position of rupture | | 1".2 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".20*, ".21*, ".10 |

## No. 6734.

Marks, L.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000288 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001367 | .000367 | ..... | ..... | |
| 50,000 | .001700 | .000333 | 0. | ..... | |
| 60,000 | .002033 | .000333 | ..... | ..... | |
| 68,000 | .002267 | .000234 | ..... | ..... | |
| 69,000 | .002333 | .000066 | ..... | ..... | Elastic limit. |
| 70,000 | .010333 | .008000 | ..... | ..... | |
| 72,000 | .011033 | .000700 | ..... | ..... | |
| 76,000 | .014500 | .003467 | ..... | ..... | |
| 80,000 | .017167 | .002667 | ..... | ..... | |
| 84,000 | .020667 | .003500 | ..... | ..... | |
| 88,000 | .023667 | .003000 | ..... | ..... | |
| 92,000 | .027667 | .004000 | ..... | ..... | |
| 96,000 | .032333 | .004666 | ..... | ..... | |
| 100,000 | .037833 | .005500 | ..... | ..... | |
| 117,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 117,0[illegible]0 |
| Elastic limit per square inch of original section | do... | 69,0[illegible]0 |
| Elongation per inch after rupture | inch.. | .18[illegible]3 |
| Elongation per inch under strain at elastic limit | do... | .0028[illegible]3 |
| Reduction in diameter at point of rupture | do... | .1[illegible]5 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | 1".6 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".12, ".33*, ".10 |

No. 6726.

Hollow specimen from breech end of barrel.
Without oil tempering.
Marks, L. Same steel as 6734.
Sectional area, .25 square inch.
Gauged length, 1″.

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds | 108,120 |
| Elastic limit per square inch of original section | do | 58,000 |
| Elongation per inch after rupture | inch | .29 |
| Elongation per inch under strain at elastic limit | do | .0023 |
| Reduction in diameter at point of rupture (exterior) | do | .0708 |
| Character of broken surface | | fine silky |

## No. 6729.

Hollow specimen from breech end of barrel.
Oil tempered.
Marks, L O T. Same steel as 6734.
Sectional area, .25 square inch.
Gauged length, 1″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .0002 | .0002 | ..... | ..... | |
| 10,000 | .0004 | .0002 | ..... | ..... | |
| 20,000 | .0007 | .0003 | ..... | ..... | |
| 30,000 | .0010 | .0003 | ..... | ..... | |
| 40,000 | .0014 | .0004 | ..... | ..... | |
| 50,000 | .0018 | .0004 | ..... | ..... | |
| 58,000 | .0021 | .0003 | ..... | ..... | |
| 59,000 | .0023 | .0002 | ..... | ..... | Elastic limit. |
| 60,000 | .0026 | .0003 | ..... | ..... | |
| | .0028 | .0002 | ..... | ..... | |
| 61,000 | .0085 | .0057 | ..... | ..... | |
| 62,000 | .0165 | .0080 | ..... | ..... | |
| 64,000 | .0180 | .0015 | ..... | ..... | |
| 66,000 | .0200 | .0020 | ..... | ..... | |
| 68,000 | .0220 | .0020 | ..... | ..... | |
| 70,000 | .0244 | .0024 | ..... | ..... | |
| 98,480 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 98,480 |
| Elastic limit per square inch of original section | do... | 59,000 |
| Elongation per inch after rupture | inch.. | .34 |
| Elongation per inch under strain at elastic limit | do... | .0023 |
| Reduction in diameter at point of rupture (exterior) | do... | .0308 |
| Character of broken surface | | silky, cup shaped |

## No. 6730.

Hollow specimen from breech end of barrel.
Oil tempered.
Marks, L O T. Same steel as 6734.
Sectional area, .25 square inch.
Gauged length, 1′.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .0002 | .0002 | ..... | ..... | |
| 10,000 | .0004 | .0002 | ..... | ..... | |
| 20,000 | .0007 | .0003 | ..... | ..... | |
| 30,000 | .0010 | .0003 | ..... | ..... | |
| 40,000 | .0013 | .0003 | ..... | ..... | |
| 50,000 | .0018 | .0005 | ..... | ..... | |
| 58,000 | .0020 | .0002 | ..... | ..... | Elastic limit. |
| 59,000 | .0092 | .0072 | ..... | ..... | |
| 60,000 | .0153 | .0061 | ..... | ..... | |
| 62,000 | .0164 | .0011 | ..... | ..... | |
| 64,000 | .0185 | .0021 | ..... | ..... | |
| 66,000 | .0195 | .0010 | ..... | ..... | |
| 68,000 | .0216 | .0021 | ..... | ..... | |
| 70,000 | .0246 | .0030 | ..... | ..... | |
| 99,200 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 99,200 |
| Elastic limit per square inch of original section | do... | 58,000 |
| Elongation per inch after rupture | inch.. | .27 |
| Elongation per inch under strain at elastic limit | do... | .0020 |
| Reduction in diameter at point of rupture (exterior) | do... | .0708 |
| Character of broken surface | | silky, cup shaped |

## No. 6837.

Marks, L 1.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001700 | .000367 | 0. | ..... | |
| 60,000 | .002033 | .000333 | ..... | ..... | |
| 70,000 | .002400 | .000367 | ..... | ..... | |
| 71,000 | .002433 | .000033 | ..... | ..... | Elastic limit. |
| 72,000 | .011000 | .008567 | ..... | ..... | |
| 74,000 | .012100 | .001100 | ..... | ..... | |
| 76,000 | .013667 | .001567 | ..... | ..... | |
| 80,000 | .016667 | .003000 | ..... | ..... | |
| 84,000 | .019833 | .003166 | ..... | ..... | |
| 88,000 | .023333 | .003500 | ..... | ..... | |
| 92,000 | .027333 | .004000 | ..... | ..... | |
| 96,000 | .031667 | .004334 | ..... | ..... | |
| 100,000 | .036667 | .005000 | ..... | ..... | |
| 104,000 | .042667 | .006000 | ..... | ..... | |
| 118,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 118,550 |
| Elastic limit per square inch of original section | do... | 71,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .002433 |
| Reduction in diameter at point of rupture | do... | .115 |
| Reduction in area after rupture, per cent of original section | | 40.3 |
| Position of rupture | | 1″.5 from neck |
| Character of broken surface | | silky, cup shaped, trace of granulation |
| Elongation of inch sections | | ″.14, ″.29*, ″.11 |

## No. 6840.

From rolled barrel at butt.
Marks, L 1 R B. Same steel as 6837.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 80,000 | .002700 | .000367 | ..... | ..... | Elastic limit. |
| | .019000 | .016300 | ..... | ..... | |
| 81,000 | .019433 | .000433 | ..... | ..... | |
| 82,000 | .020233 | .000800 | ..... | ..... | |
| 84,000 | .022000 | .001767 | ..... | ..... | |
| 88,000 | .025833 | .003833 | ..... | ..... | |
| 92,000 | .030000 | .004167 | ..... | ..... | |
| 96,000 | .034667 | .004667 | ..... | ..... | |
| 100,000 | .040667 | .006000 | ..... | ..... | |
| 117,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 117,000 |
| Elastic limit per square inch of original section | do... | 80,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do... | .002700 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1".5 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ".11, ".34*, ".15 |

## No. 6841.

From rolled barrel at butt, annealed.
Marks, L 1 R A B. Same steel as 6837.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000133 | .000133 | 0. | ..... | |
| 10,000 | .000333 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 68,000 | .002333 | .000333 | ..... | ..... | Elastic limit. |
| | .012333 | .010000 | ..... | ..... | |
| 69,000 | .013667 | .001334 | ..... | ..... | |
| 70,000 | .015000 | .001333 | ..... | ..... | |
| 72,000 | .016500 | .001500 | ..... | ..... | |
| 76,000 | .020333 | .003833 | ..... | ..... | |
| 80,000 | .024667 | .004334 | ..... | ..... | |
| 84,000 | .028333 | .003666 | ..... | ..... | |
| 88,000 | .034667 | .006334 | ..... | ..... | |
| 92,000 | .040000 | .005333 | ..... | ..... | |
| 109,000 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 109,000 |
| Elastic limit per square inch of original section | do... | 68,000 |
| Elongation per inch after rupture | inch.. | .1967 |
| Elongation per inch under strain at elastic limit | do... | .002333 |
| Reduction in diameter at point of rupture | do... | .125 |
| Reduction in area after rupture, per cent of original section | | 43.8 |
| Position of rupture | | 1".22 from neck |
| Character of broken surface | | silky serrated, trace of granulation |
| Elongation of inch sections | | ".22*, ".26*, ".11 |

## No. 6898.

**Finished barrel, oil tempered.**
**Marks, L1–0T. Same steel as 6837.**
**Sectional area, .25 square inch.**
**Gauged length, 1″.**
**Specimen taken over the powder chamber.**

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .0001 | .0001 | 0. | ..... | |
| 10,000 | .0008 | .0002 | ..... | ..... | |
| 20,000 | .0006 | .0003 | ..... | ..... | |
| 30,000 | .0009 | .0003 | ..... | ..... | |
| 40,000 | .0013 | .0004 | 0. | ..... | |
| 50,000 | .0017 | .0004 | ..... | ..... | |
| 60,000 | .0020 | .0003 | ..... | ..... | |
| 69,000 | .0024 | .0004 | ..... | ..... | Elastic limit. |
| 70,000 | .0075 | .0051 | ..... | ..... | |
| 71,000 | .0105 | .0030 | ..... | ..... | |
| 72,000 | .0125 | .0020 | ..... | ..... | |
| 76,000 | .0195 | .0070 | ..... | ..... | |
| 80,000 | .0220 | .0025 | ..... | ..... | |
| 84,000 | .0265 | .0045 | ..... | ..... | |
| 111,040 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 111,040 |
| Elastic limit per square inch of original section | do... | 69,000 |
| Elongation per inch after rupture | inch.. | .20 |
| Elongation per inch under strain at elastic limit | do... | .0024 |
| Character of broken surface | | silky, cup shaped |

## No. 6958.

Marks, L 2.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | 000100 | 0. | ..... | |
| 10,000 | .000800 | .000200 | ..... | ..... | |
| 20,000 | 000633 | 000333 | ..... | ..... | |
| 30,000 | 000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001633 | .000333 | 0. | ..... | |
| 60,000 | 001967 | .000334 | ..... | ..... | |
| 70,000 | .002333 | .000366 | ..... | ..... | |
| 73,000 | .002433 | .000100 | ..... | ..... | Elastic limit. |
| 74,000 | 002567 | 000134 | ..... | ..... | |
| 75,000 | .010733 | .008166 | ..... | ..... | |
| 76,000 | 011333 | 000600 | ..... | ..... | |
| 78,000 | .012500 | .001167 | ..... | ..... | |
| 80,000 | .014000 | 001500 | ..... | ..... | |
| 84,000 | .017067 | .003067 | ..... | ..... | |
| 88,000 | .020167 | .003100 | ..... | ..... | |
| 92,000 | .023667 | .003500 | ..... | ..... | |
| [illegible] | .027167 | .003500 | ..... | ..... | |
| [illegible] | .031667 | .004500 | ..... | ..... | |
| 121,850 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 121,850 |
| Elastic limit per square inch of original section | do.... | 73,000 |
| Elongation per inch after rupture | inch.. | .1567 |
| Elongation per inch under strain at elastic limit | do.... | .002433 |
| Reduction in diameter at point of rupture | do.... | .095 |
| Reduction in area after rupture, per cent of original section | | 34.0 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky, interspersed with fine granulation |
| Elongation of inch sections | | ".10, ".26, ".11 |

## No. 6697.

**Marks, V H R M.**
**Diameter, ".505.**
**Sectional area, .20 square inch.**
**Gauged length, 3".**

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002367 | .000367 | ..... | ..... | |
| 80,000 | .002767 | .000400 | ..... | ..... | |
| 83,000 | .002983 | .000166 | ..... | ..... | Elastic limit |
| 84,000 | .015000 | .012067 | ..... | ..... | |
| 86,000 | .016167 | .001167 | ..... | ..... | |
| 88,000 | .017667 | .001500 | ..... | ..... | |
| 92,000 | .020667 | .003000 | ..... | ..... | |
| 96,000 | .023667 | .003000 | ..... | ..... | |
| 100,000 | .027333 | .003666 | ..... | ..... | |
| 104,000 | .031000 | .003667 | ..... | ..... | |
| 108,000 | .036000 | .005000 | ..... | ..... | |
| 126,000 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 126,000 |
| Elastic limit per square inch of original section | do... | 83,000 |
| Elongation per inch after rupture | inch.. | .1700 |
| Elongation per inch under strain at elastic limit | do... | .002983 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1".1 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".28*, ".15, ".08 |

No. 6698.

Marks, V H R B.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 122,100 |
| Elastic limit per square inch of original section | do... | 74,000 |
| Elongation per inch after rupture | inch.. | .1833 |
| Elongation per inch under strain at elastic limit | do.... | .002433 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | 1".4 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".14, ".31*, ".10 |

No. 6699.

Marks, V H R A M.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002033 | .000366 | ..... | ..... | |
| 70,000 | .002367 | .000334 | ..... | ..... | |
| 76,000 | .002567 | .000200 | ..... | ..... | Elastic limit. |
| 77,000 | .026000 | .023433 | ..... | ..... | |
| 78,000 | .027500 | .001500 | ..... | ..... | |
| 80,000 | .029500 | .002000 | ..... | ..... | |
| 84,000 | .035333 | .005833 | ..... | ..... | |
| 88,000 | .042000 | .006667 | ..... | ..... | |
| 92,000 | .051333 | .009333 | ..... | ..... | |
| 104,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 104,050 |
| Elastic limit per square inch of original section | do... | 76,000 |
| Elongation per inch after rupture | inch.. | .2300 |
| Elongation per inch under strain at elastic limit | do... | .002567 |
| Reduction in diameter at point of rupture | do... | .175 |
| Reduction in area after rupture, per cent of original section | | 57.2 |
| Position of rupture | | 1".28 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".12, ".31*, ".26* |

## No. 6700.

Marks, V H R A B.
Diameter, ″.505
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001700 | .000367 | 0. | ..... | |
| 60,000 | .002033 | .000333 | ..... | ..... | |
| 70,000 | .002367 | .000334 | ..... | ..... | |
| 71,000 | .002400 | .000033 | ..... | ..... | Elastic limit. |
| 72,000 | .017167 | .014767 | ..... | ..... | |
| 74,000 | .018333 | .001166 | ..... | ..... | |
| 76,000 | .019500 | .001167 | ..... | ..... | |
| 80,000 | .023667 | .004167 | ..... | ..... | |
| 84,000 | .027333 | .003666 | ..... | ..... | |
| 88,000 | .032333 | .005000 | ..... | ..... | |
| 92,000 | .038000 | .005667 | ..... | ..... | |
| 96,000 | .045333 | .007333 | ..... | ..... | |
| 110,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 110,500 |
| Elastic limit per square inch of original section | do... | 71,000 |
| Elongation per inch after rupture | inch.. | .2200 |
| Elongation per inch under strain at elastic limit | do... | .002400 |
| Reduction in diameter at point of rupture | do... | .175 |
| Reduction in area after rupture, per cent of original section | | 57.2 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.18, ″.19, ″.34* |

No. 6701.

Marks, V H R M 1.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002367 | .000367 | ..... | ..... | |
| 80,000 | .002700 | .000333 | ..... | ..... | |
| 86,000 | .002967 | .000267 | ..... | ..... | |
| 87,000 | .003000 | .000033 | ..... | ..... | Elastic limit. |
| 88,000 | .018667 | .015667 | ..... | ..... | |
| 90,000 | .020000 | .001333 | ..... | ..... | |
| 92,000 | .021000 | .001000 | ..... | ..... | |
| 96,000 | .025000 | .004000 | ..... | ..... | |
| 100,000 | .028667 | .003667 | ..... | ..... | |
| 104,000 | .032333 | .003666 | ..... | ..... | |
| 108,000 | .037667 | .005334 | ..... | ..... | |
| 112,000 | .044000 | .006333 | ..... | ..... | |
| 125,150 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 125,150 |
| Elastic limit per square inch of original section | do... | 87,000 |
| Elongation per inch after rupture | inch.. | .1767 |
| Elongation per inch under strain at elastic limit | do... | .003000 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1″.3 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.15, ″.30*, ″.08 |

## No. 6702.

**Marks, V H R B 1.**
**Diameter, ".505.**
**Sectional area, .20 square inch.**
**Gauged length, 3".**

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| | 0. | 0. | 0. | 0. | Initial load. |
| | .000100 | .000100 | 0. | ..... | |
| | .000833 | [illegible] | ..... | ..... | |
| | .000667 | [illegible] | ..... | ..... | |
| | .001000 | [illegible] | ..... | ..... | |
| | .001333 | .000333 | ..... | ..... | |
| | .001700 | .000367 | 0. | ..... | |
| | .002033 | .000333 | ..... | ..... | |
| | .002400 | .000367 | ..... | ..... | |
| | .002567 | .000167 | ..... | ..... | [illegible] |
| | .011333 | .008766 | ..... | ..... | |
| | .012667 | .001334 | ..... | ..... | |
| | .015333 | .002666 | ..... | ..... | |
| | .018000 | .002667 | ..... | ..... | |
| | .021333 | .003333 | ..... | ..... | |
| | .024667 | .003334 | ..... | ..... | |
| | .028500 | .003833 | ..... | ..... | |
| 1 | .033667 | .005167 | ..... | ..... | |
| 1 | .038667 | .005000 | ..... | ..... | |
| 1 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 121,550 |
| Elastic limit per square inch of original section | do.... | 74,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do.... | .002567 |
| Reduction in diameter at point of rupture | do.... | .156 |
| Reduction in area after rupture, per cent of original section | | 61.9 |
| Position of rupture | | 1",3 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ⅜.15, ⅜.32, ⅜.10 |

## No. 6703.

**Marks, V H R A M 1.**
**Diameter, ".505.**
**Sectional area, .20 square inch.**
**Gauged length, 3".**

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002033 | .000366 | ..... | ..... | |
| 70,000 | .002367 | .000334 | ..... | ..... | |
| 76,000 | .002633 | .000266 | ..... | ..... | Elastic limit. |
| 77,000 | .025667 | .023034 | ..... | ..... | |
| 78,000 | .026833 | .001166 | ..... | ..... | |
| 80,000 | .028667 | .001834 | ..... | ..... | |
| 84,000 | .034333 | .005666 | ..... | ..... | |
| 88,000 | .040667 | .006334 | ..... | ..... | |
| 92,000 | .047333 | .006666 | ..... | ..... | |
| 101,450 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 101,450 |
| Elastic limit per square inch of original section | do... | 76,000 |
| Elongation per inch after rupture | inch.. | .2333 |
| Elongation per inch under strain at elastic limit | do... | .002633 |
| Reduction in diameter at point of rupture | do... | .185 |
| Reduction in area after rupture, per cent of original section | | 59.8 |
| Position of rupture | | 1".28 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".14, ".28*, ".28* |

## No. 6704.

Marks, V H R A B 1.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002033 | .000366 | ..... | ..... | |
| 70,000 | .002367 | .000334 | ..... | ..... | |
| 73,000 | .002467 | .000100 | ..... | ..... | Elastic limit. |
| 74,000 | .019333 | .016866 | ..... | ..... | |
| 76,000 | .021667 | .002334 | ..... | ..... | |
| 80,000 | .025333 | .003666 | ..... | ..... | |
| 84,000 | .030833 | .005500 | ..... | ..... | |
| 88,000 | .036000 | .005167 | ..... | ..... | |
| 92,000 | .043333 | .007333 | ..... | ..... | |
| 96,000 | .052333 | .009000 | ..... | ..... | |
| 106,900 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 106,900 |
| Elastic limit per square inch of original section | do... | 73,000 |
| Elongation per inch after rupture | inch.. | .2283 |
| Elongation per inch under strain at elastic limit | do... | .002467 |
| Reduction in diameter at point of rupture | do... | .175 |
| Reduction in area after rupture, per cent of original section | | 57.2 |
| Position of rupture | | 1″.12 from neck |
| Character of broken surface | | fine silky, serrated |
| Elongation of inch sections | | ″.12, ″.19, ″.36* |

## No. 6705.

Marks, L R B.
Diameter, ″.505.
Sectional-area, .20 square inch.
Gauged length, 3″.
Specimens Nos. 6705 to 6708, inclusive, from the same lot of steel.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001700 | .000367 | 0. | ..... | |
| 60,000 | .002033 | .000333 | ..... | ..... | |
| 70,000 | .002367 | .000334 | ..... | ..... | |
| 74,000 | .002567 | .000200 | ..... | ..... | Elastic limit. |
| 75,000 | .018000 | .015433 | ..... | ..... | |
| 76,000 | .019667 | .001667 | ..... | ..... | |
| 80,000 | .023333 | .003666 | ..... | ..... | |
| 84,000 | .027667 | .004334 | ..... | ..... | |
| 88,000 | .032333 | .004666 | ..... | ..... | |
| 92,000 | .038333 | .006000 | ..... | ..... | |
| 96,000 | .044833 | .006500 | ..... | ..... | |
| 110,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 110,900 |
| Elastic limit per square inch of original section | do... | 74,000 |
| Elongation per inch after rupture | inch.. | .2033 |
| Elongation per inch under strain at elastic limit | do... | .002567 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1″.25 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.25*, ″.25*, ″.11 |

## No. 6706.

Marks, L R M.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001367 | .000367 | ..... | ..... | |
| 50,000 | .001700 | .000333 | 0. | ..... | |
| 60,000 | .002067 | .000367 | ..... | ..... | |
| 70,000 | .002400 | .000333 | ..... | ..... | |
| 80,000 | .002733 | .000333 | ..... | ..... | |
| 83,000 | .002867 | .000134 | ..... | ..... | Elastic limit. |
| 84,000 | .023667 | .020800 | ..... | ..... | |
| 88,000 | .027333 | .003666 | ..... | ..... | |
| 92,000 | .031667 | .004334 | ..... | ..... | |
| 96,000 | .037333 | .005666 | ..... | ..... | |
| 100,000 | .043667 | .006334 | ..... | ..... | |
| 115,200 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 115,200 |
| Elastic limit per square inch of original section | do... | 83,000 |
| Elongation per inch after rupture | inch.. | .2067 |
| Elongation per inch under strain at elastic limit | do... | .002867 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | 1".6 from neck |
| Character of rupture | | fine silky, cup shaped |
| Elongation of inch sections | | ".14, ".37*, ".11 |

## No. 6707.

Marks, L R A B.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000367 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001367 | .000367 | ..... | ..... | |
| 50,000 | .001733 | .000366 | 0. | ..... | |
| 60,000 | .002067 | .000334 | ..... | ..... | |
| 65,000 | .002267 | .000200 | ..... | ..... | Elastic limit. |
| 66,000 | .022333 | .020066 | ..... | ..... | |
| 68,000 | .023333 | .001000 | ..... | ..... | |
| 72,000 | .027000 | .003667 | ..... | ..... | |
| 76,000 | .032333 | .005333 | ..... | ..... | |
| 80,000 | .038333 | .006000 | ..... | ..... | |
| 84,000 | .046667 | .008334 | ..... | ..... | |
| 99,050 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 99,050 |
| Elastic limit per square inch of original section | do... | 65,000 |
| Elongation per inch after rupture | inch.. | .2633 |
| Elongation per inch under strain at elastic limit | do... | .002267 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1″.29 from neck |
| Character of broken surface | | fine silky, serrated |
| Elongation of inch sections | | ″.20, ″.30*, ″.29* |

## No. 6708.

**Marks, L R A M.**
**Diameter, ".505.**
**Sectional area, .20 square inch.**
**Gauged length, 3".**

| Applied loads per square inch | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001367 | .000367 | ..... | ..... | |
| 50,000 | .001700 | .000333 | 0. | ..... | |
| 60,000 | .002067 | .000367 | ..... | ..... | |
| 68,000 | .002367 | .000300 | ..... | ..... | Elastic limit. |
| | .025333 | .022966 | ..... | ..... | |
| 70,000 | .026000 | .000667 | ..... | ..... | |
| 72,000 | .027167 | .001167 | ..... | ..... | |
| 75,000 | .032500 | .005333 | ..... | ..... | |
| 80,000 | .038167 | .005667 | ..... | ..... | |
| 84,000 | .044667 | .006500 | ..... | ..... | |
| 99,750 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 99,750 |
| Elastic limit per square inch of original section | do... | 68,000 |
| Elongation per inch after rupture | inch.. | .2300 |
| Elongation per inch under strain at elastic limit | do... | .002367 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1".31 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".12, ".26*, ".31* |

## No. 6846.

**Marks, C.**
**Diameter, ".505.**
**Sectional area, .20 square inch.**
**Gauged length, 3".**

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 73,000 | .002433 | .000100 | ..... | ..... | Elastic limit. |
| 74,000 | .019333 | .016900 | ..... | ..... | |
| 76,000 | .021333 | .002000 | ..... | ..... | |
| 80,000 | .026333 | .005000 | ..... | ..... | |
| 84,000 | .032000 | .005667 | ..... | ..... | |
| 88,000 | .039333 | .007333 | ..... | ..... | |
| 92,000 | .050000 | .010667 | ..... | ..... | |
| 96,000 | .063333 | .013333 | ..... | ..... | |
| 100,000 | .096667 | .033334 | ..... | ..... | |
| 100,900 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 100,900 |
| Elastic limit per square inch of original section | do... | 73,000 |
| Elongation per inch after rupture | inch.. | .1933 |
| Elongation per inch under strain at elastic limit | do... | .002433 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | ".9 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".33*, ".15, ".10 |

SAMPLE $1\frac{3}{16}$" DIAMETER BY 6" LONG, OF THE SAME STEEL AS NO. 6846, ANNEALED AT A LOW CHERRY COLOR, AND SPECIMEN THEN TURNED DOWN FROM BAR.

No. 6847.

Marks, C.
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001367 | .000367 | ..... | ..... | |
| 50,000 | .001700 | .000333 | 0. | ..... | |
| 57,000 | .002000 | .000300 | ..... | ..... | Elastic limit. |
| 58,000 | .016333 | .014333 | ..... | ..... | |
| 59,000 | .017267 | .000934 | ..... | ..... | |
| 60,000 | .017667 | .000400 | ..... | ..... | |
| 64,000 | .022000 | .004333 | ..... | ..... | |
| 68,000 | .026333 | .004333 | ..... | ..... | |
| 72,000 | .032000 | .005667 | ..... | ..... | |
| 76,000 | .039333 | .007333 | ..... | ..... | |
| 80,000 | .048333 | .009000 | ..... | ..... | |
| 90,720 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 90,720 |
| Elastic limit per square inch of original section | do... | 57,000 |
| Elongation per inch after rupture | inch.. | .2167 |
| Elongation per inch under strain at elastic limit | do... | .002000 |
| Reduction in diameter at point of rupture | do... | .204 |
| Reduction in area after rupture, per cent of original section | | 59.3 |
| Position of rupture | | 1".7 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".16, ".42*, ".07 |

## No. 6853.

From rolled barrel.
Marks, C R B. Same steel as 6846.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 64,000 | .002133 | .000183 | ..... | ..... | Elastic limit. |
| 65,000 | .019333 | .017200 | ..... | ..... | |
| 66,000 | .020000 | .000667 | ..... | ..... | |
| 68,000 | .021000 | .001000 | ..... | ..... | |
| 72,000 | .025667 | .004667 | ..... | ..... | |
| 76,000 | .030000 | .004333 | ..... | ..... | |
| 80,000 | .036000 | .006000 | ..... | ..... | |
| 84,000 | .043167 | .007167 | ..... | ..... | |
| 88,000 | .051333 | .008166 | ..... | ..... | |
| 98,500 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 98,500 |
| Elastic limit per square inch of original section | do... | 64,000 |
| Elongation per inch after rupture | inch.. | .2200 |
| Elongation per inch under strain at elastic limit | do... | .002133 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1″.05 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.33*, ″.20, ″.13 |

## No. 6854.

From rolled and annealed barrel.
Marks, C R A B. Same steel as 6846.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001633 | .000333 | 0. | ..... | |
| 55,000 | .001767 | .000134 | ..... | ..... | Elastic limit. |
| 56,000 | .017667 | .015900 | ..... | ..... | |
| 57,000 | .018333 | .000666 | ..... | ..... | |
| 58,000 | .019000 | .000667 | ..... | ..... | |
| 60,000 | .020500 | .001500 | ..... | ..... | |
| 64,000 | .025167 | .004667 | ..... | ..... | |
| 68,000 | .030333 | .005166 | ..... | ..... | |
| 72,000 | .036667 | .006334 | ..... | ..... | |
| 76,000 | .044000 | .007333 | ..... | ..... | |
| 80,000 | .055333 | .011333 | ..... | ..... | |
| 91,000 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 91,000 |
| Elastic limit per square inch of original section | do... | 55,000 |
| Elongation per inch after rupture | inch.. | .2167 |
| Elongation per inch under strain at elastic limit | do... | .001767 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | ".65 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongations of inch sections | | ".12, ".15, ".38* |

## No. 6872.

Marks, N S.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000133 | .000133 | 0. | ..... | |
| 10,000 | .000300 | .000167 | ..... | ..... | |
| 20,000 | .000667 | .000367 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002033 | .000366 | ..... | ..... | |
| 70,000 | .002367 | .000334 | ..... | ..... | |
| 80,000 | .002700 | .000333 | ..... | ..... | |
| 81,000 | .002733 | .000033 | ..... | ..... | Elastic limit. |
| 82,000 | .002867 | .000134 | ..... | ..... | |
| 88,000 | .003333 | .000966 | ..... | ..... | |
| 84,000 | .004667 | .000334 | ..... | ..... | |
| 88,000 | .011400 | .006733 | ..... | ..... | |
| 92,000 | .018667 | .007267 | ..... | ..... | |
| 96,000 | .027667 | .009000 | ..... | ..... | |
| 100,000 | .039333 | .011666 | ..... | ..... | |
| 106,900 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 106,900 |
| Elastic limit per square inch of original section | do... | 81,000 |
| Elongation per inch after rupture | inch.. | .1600 |
| Elongation per inch under strain at elastic limit | do... | .002733 |
| Reduction in diameter at point of rupture | do... | .185 |
| Reduction in area after rupture, per cent of original section | | 59.8 |
| Position of rupture | | ″.6 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.34*, ″.08, ″.06 |

## No. 6495.

Marks, S B.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Intitial load. |
| 5,000 | .000100 | .000100 | ..... | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001367 | .000367 | ..... | ..... | |
| 50,000 | .001700 | .000333 | .000033 | .000033 | |
| 60,000 | .002067 | .000367 | ..... | ..... | |
| 61,000 | .002133 | .000066 | ..... | ..... | |
| 62,000 | .002200 | .000067 | ..... | ..... | |
| 63,000 | .002267 | .000067 | ..... | ..... | |
| 64,000 | .002300 | .000033 | ..... | ..... | |
| 65,000 | .002333 | .000033 | ..... | ..... | |
| 66,000 | .002367 | .000034 | ..... | ..... | Elastic limit. |
| 67,000 | .014200 | .011833 | ..... | ..... | |
| 68,000 | .015000 | .000800 | ..... | ..... | |
| 69,000 | .015400 | .000400 | ..... | ..... | |
| 70,000 | .016267 | .000867 | ..... | ..... | |
| 72,000 | .017667 | .001400 | ..... | ..... | |
| 74,000 | .019833 | .002166 | ..... | ..... | |
| 76,000 | .021667 | .001834 | ..... | ..... | |
| 78,000 | .024000 | .002333 | ..... | ..... | |
| 80,000 | .026100 | .002100 | ..... | ..... | |
| 84,000 | .031333 | .005233 | ..... | ..... | |
| 88,000 | .035433 | .004100 | ..... | ..... | |
| 92,000 | .045000 | .009567 | ..... | ..... | |
| 96,000 | .054667 | .009667 | ..... | ..... | |
| 100,000 | .070000 | .015333 | ..... | ..... | |
| 104,900 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 104,900 |
| Elastic limit per square inch of original section | do... | 66,000 |
| Elongation per inch after rupture | inch.. | .1967 |
| Elongation per inch under strain at elastic limit | do... | .002367 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | 1″.3 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ″.18, ″.26*, ″.15 |

## TABULATION OF TENSION SPECIMENS FROM RIFLE-BARREL STEEL. (LENGTH OF STEMS, 8″.)

| No. of test. | Marks. | Diameter. | Sectional area. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation in 8 inches. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Per cent.* | *Per cent.* | | *Inch.* | |
| 6493 | S 6 | .505 | .20 | 71,000 | 122,400 | 16.7 | 43.3 | Fine silky, cup shaped | .11, .27*, .12 | |
| 6494 | S 6 | .505 | .20 | 69,000 | 118,900 | 19.0 | 49.1 | .....do | .12, .33*, .12 | |
| 6498 | S 6 | .505 | .20 | 69,000 | 119,000 | 19.7 | 51.9 | .....do | .12, .35*, .12 | |
| 6499 | S 6 | .505 | .20 | 65,000 | 116,100 | 18.0 | 51.9 | .....do | .09, .13, .32* | From rolled barrel without heating. |
| 6500 | S 6 | .505 | .20 | 58,000 | 105,400 | 17.7 | 51.9 | Fine silky | | From balance of rolled barrel, reheated in gas furnace and packed in lime. |
| 6502 | S 6 | .505 | .20 | 68,000 | 114,700 | 19.0 | 49.1 | Fine silky, cup shaped | .10, .27*, .20 | Rolled barrel after reheating and annealing. |
| 6508 | S 6 | .505 | .20 | 69,000 | 123,950 | 17.3 | 46.2 | Fine silky | .24*, .18, .10 | |
| 6550 | S 6 | .505 | .20 | 68,000 | 121,050 | 17.7 | 43.3 | Fine silky, cup shaped | .11, .31*, .11 | |
| 6551 | S 6 R | .505 | .20 | 59,000 | 97,100 | 27.7 | 59.8 | .....do | .18, .45*, .20 | From rolled barrel. |
| 6552 | S 7 | .505 | .20 | 67,000 | 120,500 | 18.3 | 46.2 | Fine silky | .12, .31*, .12 | |
| 6553 | S 7 R | .505 | .20 | 62,000 | 102,050 | 23.3 | 54.6 | Fine silky, cup shaped | | From rolled barrel, reheated and annealed in lime. |
| 6575 | S 8 | .505 | .20 | 70,000 | 113,500 | 19.0 | 46.2 | Fine silky | .15, .31*, .11 | |
| 6577 | S 8 R | .505 | .20 | 68,000 | 108,000 | 19.3 | 54.6 | Fine silky, cup shaped | .10, .13, .35* | From rolled barrel. |
| 6578 | S 8 R A | .505 | .20 | 80,000 | 105,500 | 24.3 | 62.2 | Fine silky, serrated edges | .14, .42*, .17 | From rolled barrel, cooled in air, reheated in gas furnace and annealed in lime. |
| 6589 | S 9 | .505 | .20 | 65,000 | 117,600 | 19.0 | 51.9 | Fine silky | .13, .33*, .11 | |
| 6608 | S 9 | .505 | .20 | 69,000 | 116,000 | 19.0 | 51.9 | Fine silky, cup shaped | .12, .33*, .12 | |
| 6611 | S-10 | .505 | .20 | 73,000 | 119,200 | 18.3 | 51.9 | .....do | .18, .27*, .10 | |
| 6616 | S 9-R | .505 | .20 | 68,000 | 102,050 | 21.7 | 57.2 | .....do | .17, .36*, .12 | |
| 6617 | S 9-R A | .505 | .20 | 69,000 | 97,550 | 24.7 | 62.2 | .....do | .15, .44*, .15 | |
| 6618 | S-10-R | .505 | .20 | 71,000 | 111,950 | 21.3 | 57.2 | .....do | .12, .37*, .15 | |
| 6619 | S-10 R A | .505 | .20 | 72,000 | 112,550 | 21.3 | 57.2 | Fine silky | .12, .18, .34* | |
| 6620 | S-10-1 | .505 | .20 | 70,000 | 115,100 | 19.3 | 49.1 | Fine silky, cup shaped | .12, .34*, .12 | |
| 6621 | S-10-2 | .505 | .20 | 70,000 | 123,050 | 17.3 | 49.1 | .....do | .11, .30*, .11 | |
| 6622 | S-11 | .505 | .20 | 70,000 | 114,100 | 19.7 | 51.9 | .....do | .20, .28*, .11 | |
| 6631 | S-12 | .505 | .20 | 69,000 | 109,600 | 21.3 | 54.6 | .....do | .13, .37*, .14 | |
| 6641 | S-13 | .505 | .20 | 69,000 | 113,050 | 20.0 | 49.1 | Fine silky | .13, .34*, .13 | |
| 6719 | S-14 | .505 | .20 | 71,000 | 108,000 | 21.7 | 54.6 | Fine silky, cup shaped | .12, .35*, .18 | |
| 6736 | S-14 | .505 | .20 | 72,000 | 108,500 | 23.3 | 57.2 | .....do | .19, .38*, .13 | |
| 6757 | S-15 | .505 | .20 | 71,000 | 113,850 | 22.0 | 54.6 | .....do | .20, .34*, .12 | |
| 6786 | S-15 R B | .505 | .20 | 70,000 | 115,300 | 18.7 | 54.6 | .....do | .08, .15, .33* | Rolled barrel, butt. |
| 6787 | S-15 R M | .505 | .20 | 74,000 | 118,000 | 19.7 | 57.2 | .....do | .10, .34*, .15 | Rolled barrel, muzzle. |
| 6788 | S-15 R A B | .505 | .20 | 65,000 | 95,500 | 21.3 | 54.6 | Fine silky, serrated | .34*, .19, .11 | Butt, Rolled barrel, annealed. |
| 6789 | S-15 R A M | .505 | .20 | 66,000 | 93,600 | 24.3 | 57.2 | Silky, serrated | .14, .38*, .21 | Muzzle, Rolled barrel, annealed. |
| 6791 | S-15 O T | Hollow. | .25 | 54,000 | 96,320 | 27.0 | ..... | Silky, cup shaped | | Finished barrel, oil tempered. |

## TABULATION OF TENSION SPECIMENS FROM RIFLE-BARREL STEEL. (LENGTH OF STEMS, 3″.)—Continued.

| No. of test. | Marks. | Diameter. | Sectional area. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation in 8 inches. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Per cent.* | *Per cent.* | | *Inch.* | |
| 6808 | S 16 | .505 | .20 | 78,000 | 123,900 | 16.8 | 40.3 | ..... | .10, .20, .19 | |
| 6809 | S-16 R B | .505 | .20 | 80,000 | 120,400 | 19.3 | 51.9 | ..... | .11, .34*, .13 | Butt, Rolled barrel. |
| 6810 | S-16 R M | .505 | .20 | 81,000 | 123,100 | 18.0 | 51.9 | ..... | .14, .32*, .06 | Muzzle, Rolled barrel. |
| 6811 | S-16 R A B | .505 | .20 | 60,000 | 92,550 | 22.3 | 43.3 | nulation..... | .29, .23*, .15 | Butt, Rolled barrel, annealed. |
| 6812 | S-16 R A M | .505 | .20 | 60,000 | 91,500 | 24.3 | 56.8 | es ..... | .22, .33*, .13 | Muzzle, Rolled barrel, annealed. |
| 6814 | S-16 O T | Hollow. | .25 | 58,000 | 105,840 | 15.0 | ..... | ..... | ..... | |
| 6835 | S-17 | .505 | .20 | 70,000 | 115,300 | 20.0 | 46.2 | ..... | .13, .33*, .14 | |
| 6896 | S-17 R | .505 | .20 | 79,000 | 112,050 | 22.3 | 57.2 | ..... | .14, .39*, .14 | Rolled barrel. |
| 6896 | S-17 R A | .505 | .20 | 76,000 | 109,500 | 21.0 | 57.2 | ..... | .10, .17, .36* | Rolled barrel, annealed. |
| 6917 | S 17 O T | Hollow. | .25 | 64,000 | 107,800 | 27.0 | ..... | ..... | ..... | Finished barrel, oil tempered. |
| 6851 | S-18 | .506 | .20 | 77,000 | 118,100 | 19.0 | 51.9 | ..... | .10, .27*, .20 | |
| 6852 | S-19 | .505 | .20 | 73,000 | 116,000 | 19.7 | 54.5 | .....do..... | .11, .29*, .19 | |
| 6871 | S-20 | .505 | .20 | 76,000 | 115,500 | 20.3 | 51.9 | .....do..... | .12, .37*, .12 | |
| 7205 | S 26 | .505 | .20 | 68,000 | 118,400 | 18.3 | 49.1 | .....do..... | .10, .33*, .12 | |
| 7206 | S 26 | .505 | .20 | 69,000 | 122,700 | 17.7 | 46.2 | .....do..... | .11, .31*, .12 | |
| 7207 | S 26 | .505 | .20 | 67,000 | 120,500 | 17.7 | 49.1 | .....do..... | .10, .32*, .11 | |
| 6466 | S G C | .505 | .20 | 64,000 | 104,900 | 18.3 | 49.1 | Silky ..... | .34*, .13, .08 | |
| 6467 | S G L | .505 | .20 | 69,000 | 105,400 | 20.7 | 49.1 | .....do..... | .34*, .17, .11 | |
| 6468 | S R C | .505 | .20 | 63,000 | 111,350 | 20.0 | 51.9 | .....do..... | .13, .35*, .12 | |
| 6469 | S R L | .505 | .20 | 56,000 | 102,450 | 21.0 | 54.6 | Fine silky ..... | .10, .19, .34* | |
| 6470 | S 4 | .505 | .20 | 66,000 | 108,800 | 20.3 | 54.6 | .....do..... | .37*, .14, .10 | |
| 6471 | S 5 | .505 | .20 | 49,000 | 109,450 | 17.3 | 30.7 | Fine granular 50 per cent, silky 50 per cent. | .14, .26*, .12 | |
| 6472 | S 2 | .505 | .20 | 56,000 | 125,450 | 12.3 | 23.9 | Fine granular, dull center..... | .19*, .10, .08 | |
| 6506 | 2 | .505 | .20 | 68,000 | 121,400 | 18.7 | 51.9 | Fine silky ..... | .11, .34*, .11 | From bars as received from steel makers. |
| 6504 | 3 | .505 | .20 | 72,000 | 122,850 | 18.7 | 51.9 | .....do..... | .11, .33*, .12 | |
| 6505 | 4 | .505 | .20 | 67,000 | 119,600 | 18.3 | 46.2 | .....do..... | .12, .31*, .12 | |
| 6506 | 5 | .506 | .20 | 67,000 | 124,550 | 17.3 | 46.2 | .....do..... | .10, .32*, .10 | |
| 6507 | 6 | .505 | .20 | 67,000 | 118,550 | 18.7 | 51.9 | .....do..... | .10, .28*, .18 | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6519 | 2 R | .505 | .20 | 64,000 | 104,550 | 18.3 | 57.2 | , cup shaped | .37*, .10, .06 | arrel, blue ends. | | |
| 6520 | 3 R | .505 | .20 | 66,000 | 111,400 | 17.7 | 54.6 | | .08, .11, .34* | arrel, yellow ends. | | |
| 6521 | 4 R | .505 | .20 | 63,000 | 107,550 | 21.7 | 54.6 | | .12, .21, .32* | arrel, white ends. | | |
| 6522 | 5 R | .505 | .20 | 67,000 | 112,000 | 20.0 | 54.6 | haped | .37*, .13, .10 | arrel, orange ends. | | |
| 6523 | 6 R | .505 | .20 | 66,000 | 104,900 | 20.7 | 57.2 | | .39*, .12, .10 | arrel, black ends. | | |
| 6720 | S J B | .505 | .20 | 77,000 | 100,900 | 19.3 | 62.2 | | .89, .11, .08 | ank. | | |
| 6754 | S J B O T | Hollow. | .25 | 110,000 | 135,920 | 9.0 | | | | ll tempered at butt. | From same lot of blanks. | |
| 6755 | S J B O T | Hollow. | .25 | 79,000 | 104,960 | 2.6 | | | | do | | |
| 6726 | S & J | .505 | .20 | 66,000 | 109,000 | 19.3 | 61.9 | | .11, .13, .34* | From blank received from the steel makers. | | |
| 9678 | S (1) | Hollow. | .25 | Not well defined. | 117,280 | 8.0 | | | | Specimen over pow- | From barrel oil tempered at low heat along length of powder chamber. | |
| 6609 | S (1) | Hollow. | .10 | 48,000 | 113,200 | 11.7 | | | .17*, .09, .09 | of length of barrel, untreated part. | | |
| 9679 | S (2) | Hollow. | .25 | Not well defined. | 110,000 | 10.0 | | Granular, brittle | | Specimen over powder chamber. | | |
| 6610 | S (2) | Hollow. | .10 | 48,000 | 107,000 | 13.3 | | Fine granular | | From middle of length of barrel, untreated part. | Do. | |
| 9680 | S | Hollow. | .25 | 66,480 | 115,320 | 17.0 | | Silky, cup shaped | | Specimen over pow- | | |
| 6579 | S | Hollow. | .10 | 68,000 | 114,400 | 16.7 | | do | | of length of barrel. | From same finished barrel. | |
| 6579a | S | Hollow. | .10 | 67,000 | 113,800 | 10.0 | | do | | From muzzle end of barrel. | | |
| 9681 | S | Hollow. | .25 | 66,720 | 117,280 | 15.0 | | Silky, cup shaped, 50 per cent; fine granular, 50 per cent. | | Specimen over powder chamber. | | |
| 6580 | S | Hollow. | .10 | 66,000 | 111,800 | 17.3 | | Silky, cup shaped | .12, .29*, .12 | From middle of length of barrel. | From same finished barrel. | |
| 6581 | S | Hollow. | .10 | 64,000 | 112,000 | 12.7 | | do | .08, .11, .24* | From muzzle end of barrel. | | |
| 6607 | H | .505 | .20 | 70,000 | 130,100 | 16.0 | 43.3 | Fine silky, cup shaped | .11, .27*, .10 | | | |
| 6725 | H | Hollow. | .25 | 60,000 | 112,880 | 19.0 | | Silky, 50 per cent; fine granular, 50 per cent. | | From breech of barrel, not oil tempered. | From same lot of steel. | |
| 6727 | H O T | Hollow. | .25 | 66,000 | 109,690 | 24.0 | | Silky, cup shaped | | From breech of barrel, oil tempered. | | |
| 6728 | H O T | Hollow. | .25 | 61,000 | 106,000 | 22.6 | | do | | Do. | | |
| 6733 | H | .505 | .20 | 67,000 | 127,000 | 15.3 | | Fine silky, cup shaped | .09, .10, .27* | | | |
| 6696 | $H_1$ | .505 | .20 | 70,000 | 131,100 | 15.3 | 43.3 | do | .26*, .12, .06 | | | |
| 6688 | $H_1$ R B | .505 | .20 | 78,000 | 129,050 | 16.7 | 49.1 | Fine silky | .20, .21*, .09 | Rolled barrel, at butt | | |
| 6689 | $H_1$ R A B | .505 | .20 | 72,000 | 110,200 | 19.0 | 57.2 | Fine silky, serrated | .09, .11, .37* | Rolled barrel, at butt, annealed | | |
| 6916 | $H_1$ O T | Hollow. | .25 | 63,000 | 112,800 | 15.0 | | Silky, cup shaped | | Finished barrel, oil tempered, specimen over powder chamber. | From same lot of steel. | |

*TABULATION OF TENSION SPECIMENS FROM RIFLE-BARREL STEEL. (LENGTH OF STEMS, 3″.)*—Continued.

| No. of test. | Marks. | Diameter. | Sectional area. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation in 8 inches. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. | Remarks. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Per cent.* | *Per cent.* | | *Inch.* | | |
| 6623 | L | .505 | .20 | 67,000 | 117,900 | 17.0 | 37.1 | Fine silky, cup shaped | .20*, .21*, .10 | | |
| 6734 | L | .505 | .20 | 69,000 | 117,050 | 18.3 | 46.2 | do | .12, .33*, .10 | | |
| 6726 | L | Hollow. | .25 | 58,000 | 103,120 | 29.0 | | Fine silky | | From breech of barrel, not oil tempered. | From same lot of steel. |
| 6729 | L O T | Hollow. | .25 | 59,000 | 98,480 | 34.0 | | Silky, cup shaped | | From breech of barrel, oil tempered. | |
| 6730 | L O T | Hollow. | .25 | 58,000 | 99,200 | 27.0 | | do | | Do. | |
| 6837 | $L_1$ | .505 | .20 | 71,000 | 118,550 | 18.0 | | Silky, cup shaped; trace of granulation. | .14, .29*, .11 | | |
| 6840 | $L_1$ R B | .505 | .20 | 80,000 | 117,000 | 20.0 | 51.9 | Fine silky | .11, .34*, .15 | Rolled barrel at butt. | |
| 6841 | $L_1$ R A B | .505 | .20 | 68,000 | 109,000 | 19.7 | 43.3 | Silky, serrated, trace of granulation | | Rolled barrel at butt, annealed. | |
| 6898 | $L_1$ O T | Hollow. | .25 | 69,000 | 111,040 | 20.0 | | Silky, cup shaped | | Finished barrel, oil tempered; specimen over powder chamber. | From same lot of steel. |
| 6958 | L2 | .505 | .20 | 73,000 | 121,850 | 15.7 | 34.0 | Silky, interspersed with fine granulation | .10, .26*, .11 | | |
| 6697 | V H R M | .505 | .20 | 83,000 | 126,000 | 17.0 | 51.9 | Fine silky, cup shaped | .28*, .15, .08 | | |
| 6698 | V H R B | .505 | .20 | 74,000 | 122,100 | 18.3 | 49.1 | do | .14, .31*, .10 | | |
| 6699 | V H R A M | .505 | .20 | 76,000 | 104,050 | 23.0 | 57.2 | do | .12, .31*, .26* | | |
| 6700 | V H R A B | .505 | .20 | 71,000 | 110,500 | 22.0 | 57.2 | do | .13, .19, .34* | | |
| 6701 | V H R $M_1$ | .505 | .20 | 87,000 | 125,150 | 17.7 | 51.9 | do | .15, .30*, .08 | | |
| 6702 | V H R $B_1$ | .505 | .20 | 74,000 | 121,550 | 19.0 | 51.9 | do | .15, .32*, .10 | | |
| 6703 | V H R A $M_1$ | .505 | .20 | 76,000 | 101,450 | 23.8 | 59.8 | do | .14, .28*, .28* | | |
| 6704 | V H R A $B_1$ | .505 | .20 | 73,000 | 106,900 | 22.3 | 57.2 | Fine silky, serrated | .12, .19, .36 | | |
| 6705 | L R B | .505 | .20 | 74,000 | 110,900 | 20.3 | 51.9 | Fine silky, cup shaped | .25*, .25*, .11 | | |
| 6706 | L R M | .505 | .20 | 83,000 | 115,200 | 20.7 | 54.6 | do | .14, .37*, .11 | | From same lot of steel. |
| 6707 | L R A B | .505 | .20 | 65,000 | 99,050 | 26.3 | 51.9 | Fine silky, serrated | .20, .30*, .29 | | |
| 6708 | L R A M | .505 | .20 | 68,000 | 99,750 | 23.0 | 51.9 | Fine silky, cup shaped | .12, .26*, .31* | | |
| 6846 | C | .505 | .20 | 73,000 | 100,900 | 19.3 | 51.9 | do | .33*, .15, .10 | | |
| 6847 | C | .564 | .25 | 57,000 | 90,720 | 21.7 | 59.3 | do | .16, .42*, .07 | Annealed at low cherry, then turned down from bar. | From same lot of steel. |
| 6853 | C R B | .505 | .20 | 64,000 | 98,500 | 22.0 | 51.9 | do | .33*, .20, .13 | Rolled barrel. | |
| 6854 | C R A B | .505 | .20 | 55,000 | 91,000 | 21.7 | 54.6 | do | .12, .15, .33* | Rolled barrel, annealed. | |
| 6872 | N S | .505 | .20 | 81,000 | 106,900 | 16.0 | 59.8 | do | .34*, .08, .06 | | |
| 6495 | S B | .505 | .20 | 66,000 | 104,900 | 19.7 | 30.7 | Fine silky | .18, .26*, .15 | | |

## RIFLE BARRELS DIFFICULT TO DRILL.

Ten .30-caliber rifle barrels that gave difficulty in drilling at the Springfield Armory were examined for physical properties in the state they were found after the work of drilling was suspended, and also after treatment of the metal at Watertown Arsenal by annealing, oil quenching and annealing, and by swaging and annealing.

Specimens were first taken from each barrel in the vicinity of or over the place at which drilling of the bores was suspended, and samples were also taken from other parts of some of the barrels, as the details of the tests describe.

The primary object of the tests was to ascertain what physical properties were present which might account for the difficulties encountered in attempting to drill these several barrels.

Specimens were therefore taken at those places where the operation of drilling was suspended, the middle of the length of the specimen being located where the drilling of the barrel at Springfield Armory stopped.

In order to secure a uniform cross-sectional area the drilling was resumed at Watertown Arsenal and carried through the remaining part of each specimen, thus making hollow or annular specimens when finished for testing.

The specimens were generally granular in the fractures, the elastic limits somewhat vague in a number of instances.

The tests were extended to include certain treatment of the metal given at Watertown Arsenal.

A number of pieces were annealed by heating to different temperatures and cooling in lime or charcoal.

Additional bars were heated a low red and swaged to $\frac{3}{4}''$ diameter, a reduction of $\frac{1}{8}''$.

The bars were subsequently annealed in charcoal and then turned down for tensile tests, after which the elastic limits were more sharply defined, and silky fractures generally prevailed.

Tests were also made, after oil quenching and annealing, as a means of imparting different combinations of tensile properties to the metal.

## No. 6554.

Breech specimen.
Marks, (1) S.
Exterior diameter, ″.588.
Interior diameter, ″.300.
Sectional area, .20 square inch.
Gauged length, 3″.
Drilling of barrel suspended at location of this specimen.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000800 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 45,000 | .001533 | .000200 | ..... | ..... | |
| 46,000 | .001567 | .000034 | ..... | ..... | |
| 47,000 | .001633 | .000066 | ..... | ..... | Elastic limit. |
| 48,000 | .002267 | .000634 | ..... | ..... | |
| 49,000 | .002600 | .000333 | ..... | ..... | |
| 50,000 | .002933 | .000333 | ..... | ..... | |
| 51,000 | .003300 | .000367 | ..... | ..... | |
| 52,000 | .003933 | .000633 | ..... | ..... | |
| 53,000 | .005667 | .001734 | ..... | ..... | |
| 54,000 | .007667 | .002000 | ..... | ..... | |
| 56,000 | .009167 | .001500 | ..... | ..... | |
| 58,000 | .009467 | .000300 | ..... | ..... | |
| 60,000 | .010667 | .001200 | ..... | ..... | |
| 64,000 | .013000 | .002333 | ..... | ..... | |
| 68,000 | .016067 | .003067 | ..... | ..... | |
| 72,000 | .018000 | .001933 | ..... | ..... | |
| 76,000 | .021000 | .003000 | ..... | ..... | |
| 80,000 | .024333 | .003333 | ..... | ..... | |
| 84,000 | .027767 | .003434 | ..... | ..... | |
| 88,000 | .031833 | .004066 | ..... | ..... | |
| 92,000 | .037000 | .005167 | ..... | ..... | |
| 96,000 | .041667 | .004667 | ..... | ..... | |
| 100,000 | .049667 | .008000 | ..... | ..... | |
| 104,000 | .060000 | .010333 | ..... | ..... | |
| 112,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 112,050 |
| Elastic limit per square inch of original section | do... | 47,000 |
| Elongation per inch after rupture | inch.. | .1200 |
| Elongation per inch under strain at elastic limit | do... | .001633 |
| Reduction in diameter at point of rupture (exterior) | do... | .048 |
| Position of rupture | | ″.7 from neck |
| Character of broken surface | | fine granular |
| Elongation of inch sections | | ″.14*, ″.13, ″.09 |

## No. 6555.

Muzzle specimen.
Marks, (1) S.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | 0. | ..... | |
| 50,000 | .001700 | .000367 | ..... | ..... | |
| 60,000 | .002067 | .000367 | ..... | ..... | |
| 61,000 | .002100 | .000033 | ..... | ..... | |
| 62,000 | .002133 | .000033 | ..... | ..... | Elastic limit. |
| 63,000 | .002267 | .000134 | ..... | ..... | |
| | .004333 | .002066 | ..... | ..... | |
| 64,000 | .005667 | .001334 | ..... | ..... | |
| 66,000 | .009333 | .003666 | ..... | ..... | |
| 68,000 | .010933 | .001600 | ..... | ..... | |
| 72,000 | .012167 | .001234 | ..... | ..... | |
| 76,000 | .015000 | .002833 | ..... | ..... | |
| 80,000 | .017000 | .002000 | ..... | ..... | |
| 84,000 | .019500 | .002500 | ..... | ..... | |
| 88,000 | .022667 | .003167 | ..... | ..... | |
| 92,000 | .025333 | .002666 | ..... | ..... | |
| 96,000 | .029000 | .003667 | ..... | ..... | |
| 100,000 | .033000 | .004000 | ..... | ..... | |
| 104,000 | .037500 | .004500 | ..... | ..... | |
| 108,000 | .043333 | .005833 | ..... | ..... | |
| 112,000 | .051667 | .008334 | ..... | ..... | |
| 121,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 121,400 |
| Elastic limit per square inch of original section | do... | 62,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .002133 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ″.11, ″.31*, ″.12 |

## No. 6556.

Breech specimen.
Marks, (2) S.
Exterior diameter, ″.588.
Interior diameter, ″.300.
Sectional area, .20 square inch.
Gauged length, 3″.
Drilling of barrel suspended at location of this specimen.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| •10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | 0. | ..... | |
| 50,000 | .001633 | .000333 | ..... | ..... | |
| 51,000 | .001667 | .000034 | ..... | ..... | |
| 52,000 | .001700 | .000033 | ..... | ..... | |
| 53,000 | .001733 | .000033 | ..... | ..... | Elastic limit. |
| 54,000 | .001967 | .000234 | ..... | ..... | |
| 55,000 | .002233 | .000266 | ..... | ..... | |
| 56,000 | .002367 | .000134 | ..... | ..... | |
| 57,000 | .002633 | .000266 | ..... | ..... | |
| 58,000 | .002833 | .000200 | ..... | ..... | |
| 59,000 | .003067 | .000234 | ..... | ..... | |
| 60,000 | .003333 | .000266 | ..... | ..... | |
| 62,000 | .004033 | .000700 | ..... | ..... | |
| 64,000 | .004667 | .000634 | ..... | ..... | |
| 68,000 | .006333 | .001666 | ..... | ..... | |
| 72,000 | .008167 | .001834 | ..... | ..... | |
| 76,000 | .010000 | .001833 | ..... | ..... | |
| 80,000 | .012000 | .002000 | ..... | ..... | |
| 84,000 | .014333 | .002333 | ..... | ..... | |
| 88,000 | .016167 | .001834 | ..... | ..... | |
| 92,000 | .018667 | .002500 | ..... | ..... | |
| 96,000 | .021333 | .002666 | ..... | ..... | |
| 100,000 | .024333 | .003000 | ..... | ..... | |
| 104,000 | .027500 | .003167 | ..... | ..... | |
| 108,000 | .030833 | .003333 | ..... | ..... | |
| 128,350 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 128,850 |
| Elastic limit per square inch of original section | do... | 53,000 |
| Elongation per inch after rupture | inch.. | .0900 |
| Elongation per inch under strain at elastic limit | do... | .001733 |
| Reduction in diameter at point of rupture (exterior) | do... | .038 |
| Position of rupture | | ″.65 from neck |
| Character of broken surface | | fine granular |
| Elongation of inch sections | | ″.14*, ″.08, ″.05 |

## No. 6557.

Muzzle specimen.
Marks, (2) S.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | ..... | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 61,000 | .002067 | .000067 | ..... | ..... | Elastic limit. |
| 62,000 | .002333 | .000266 | ..... | ..... | |
| | .002767 | .000434 | ..... | ..... | |
| 63,000 | .003667 | .000900 | ..... | ..... | |
| 64,000 | .004333 | .000666 | ..... | ..... | |
| 66,000 | .005167 | .000834 | ..... | ..... | |
| 68,000 | .006167 | .001000 | ..... | ..... | |
| 72,000 | .008667 | .002500 | ..... | ..... | |
| 76,000 | .010000 | .001333 | ..... | ..... | |
| 80,000 | .012000 | .002000 | ..... | ..... | |
| 84,000 | .014333 | .002333 | ..... | ..... | |
| 88,000 | .016667 | .002334 | ..... | ..... | |
| 92,000 | .019000 | .002333 | ..... | ..... | |
| 96,000 | .021667 | .002667 | ..... | ..... | |
| 100,000 | .024667 | .003000 | ..... | ..... | |
| 104,000 | .028000 | .003333 | ..... | ..... | |
| 108,000 | .031667 | .003667 | ..... | ..... | |
| 112,000 | .035667 | .004000 | ..... | ..... | |
| 116,000 | .041167 | .005500 | ..... | ..... | |
| 128,600 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 128,600 |
| Elastic limit per square inch of original section | do... | 61,000 |
| Elongation per inch after rupture | inch.. | .1283 |
| Elongation per inch under strain at elastic limit | do... | .002067 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | ".8 from neck |
| Character of broken surface | | granular, radiating from a silky spot at the circumference |
| Elongation of inch sections | | ".08, ".10, ".19* |

## No. 6558.

Breech specimen.
Marks, (3) S.
Exterior diameter, ".588.
Interior diameter, ".300.
Sectional area, .20 square inch.
Gauged length, 3".
Drilling of barrel suspended at location of this specimen.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | 0. | ..... | |
| 50,000 | .001667 | .000367 | ..... | ..... | |
| 54,000 | .001800 | .000133 | ..... | ..... | |
| 55,000 | .001833 | .000033 | ..... | ..... | Elastic limit. |
| 56,000 | .001967 | .000134 | ..... | ..... | |
| 57,000 | .002267 | .000300 | ..... | ..... | |
| 58,000 | .002600 | .000333 | ..... | ..... | |
| 59,000 | .002900 | .000300 | ..... | ..... | |
| 60,000 | .003267 | .000367 | ..... | ..... | |
| 62,000 | .003833 | .000566 | ..... | ..... | |
| 64,000 | .004667 | .000834 | ..... | ..... | |
| 68,000 | .006333 | .001666 | ..... | ..... | |
| 72,000 | .008000 | .001667 | ..... | ..... | |
| 76,000 | .010000 | .002000 | ..... | ..... | |
| 80,000 | .012333 | .002333 | ..... | ..... | |
| 84,000 | .014500 | .002167 | ..... | ..... | |
| 88,000 | .016667 | .002167 | ..... | ..... | |
| 92,000 | .019500 | .002833 | ..... | ..... | |
| 96,000 | .022000 | .002500 | ..... | ..... | |
| 100,000 | .025167 | .003167 | ..... | ..... | |
| 104,000 | .029100 | .003933 | ..... | ..... | |
| 108,000 | .033000 | .003900 | ..... | ..... | |
| 112,000 | .038167 | .005167 | ..... | ..... | |
| 125,600 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 125,600 |
| Elastic limit per square inch of original section | do... | 55,000 |
| Elongation per inch after rupture | inch.. | .0933 |
| Elongation per inch under strain at elastic limit | do... | .001833 |
| Reduction in diameter at point of rupture (exterior) | do... | .058 |
| Position of rupture | | ".6 from neck |
| Character of broken surface | | fine, granular |
| Elongation of inch sections | | ".05, ".07, ".16* |

## No. 6559.

Muzzle specimen.
Marks, (3) S.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000800 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000367 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | 0. | ..... | |
| 50,000 | .001667 | .000334 | ..... | ..... | |
| 60,000 | .002033 | .000366 | ..... | ..... | |
| 61,000 | .002067 | .000034 | ..... | ..... | |
| 62,000 | .002100 | .000033 | ..... | ..... | |
| 63,000 | .002167 | .000067 | ..... | ..... | Elastic limit. |
| 64,000 | .002800 | .000633 | ..... | ..... | |
| 65,000 | .003667 | .000867 | ..... | ..... | |
| 66,000 | .005267 | .001600 | ..... | ..... | |
| 68,000 | .006067 | .000800 | ..... | ..... | |
| 70,000 | .007067 | .001000 | ..... | ..... | |
| 72,000 | .008067 | .001000 | ..... | ..... | |
| 76,000 | .010167 | .002100 | ..... | ..... | |
| 80,000 | .012667 | .002500 | ..... | ..... | |
| 84,000 | .015000 | .002333 | ..... | ..... | |
| 88,000 | .017833 | .002833 | ..... | ..... | |
| 92,000 | .020000 | .002167 | ..... | ..... | |
| 96,000 | .022833 | .002833 | ..... | ..... | |
| 100,000 | .025667 | .002834 | ..... | ..... | |
| 104,000 | .029333 | .003666 | ..... | ..... | |
| 108,000 | .033167 | .003834 | ..... | ..... | |
| 112,000 | .034667 | .001500 | ..... | ..... | |
| 116,000 | .043333 | .008666 | ..... | ..... | |
| 126,950 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 126,950 |
| Elastic limit per square inch of original section | do... | 63,000 |
| Elongation per inch after rupture | inch.. | .1667 |
| Elongation per inch under strain at elastic limit | do... | .002167 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | ".7 from neck |
| Character of broken surface | | silky, interspersed with fine granulation |
| Elongation of inch sections | | ".08, ".10, ".22* |

## No. 6560.

Breech specimen.
Marks, (4) S.
Exterior diameter, ″.588.
Interior diameter, ″.300.
Sectional area, .20 square inch.
Gauged length, 3″.
Drilling of barrel suspended at location of this specimen.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | 0. | ..... | |
| 50,000 | .001633 | .000333 | ..... | ..... | |
| 52,000 | .001733 | .000100 | ..... | ..... | |
| 53,000 | .001767 | .000034 | ..... | ..... | |
| 54,000 | .001833 | .000066 | ..... | ..... | |
| 55,000 | .001867 | .000034 | ..... | ..... | Elastic limit. |
| 56,000 | .002100 | .000233 | ..... | ..... | |
| 57,000 | .002600 | .000500 | ..... | ..... | |
| 58,000 | .003000 | .000400 | ..... | ..... | |
| 59,000 | .003667 | .000667 | ..... | ..... | |
| 60,000 | .005000 | .001333 | ..... | ..... | |
| 62,000 | .005967 | .000967 | ..... | ..... | |
| 64,000 | .006767 | .000800 | ..... | ..... | |
| 68,000 | .009367 | .002600 | ..... | ..... | |
| 72,000 | .010933 | .001566 | ..... | ..... | |
| 76,000 | .013667 | .002734 | ..... | ..... | |
| 80,000 | .015667 | .002000 | ..... | ..... | |
| 84,000 | .018333 | .002666 | ..... | ..... | |
| 88,000 | .022000 | .003667 | ..... | ..... | |
| 92,000 | .024167 | .002167 | ..... | ..... | |
| 96,000 | .027500 | .003333 | ..... | ..... | |
| 100,000 | .031667 | .004167 | ..... | ..... | |
| 104,000 | .036100 | .004433 | ..... | ..... | |
| 108,000 | .041667 | .005567 | ..... | ..... | |
| 121,100 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 121,100 |
| Elastic limit per square inch of original section | do... | 55,000 |
| Elongation per inch after rupture | inch.. | .1233 |
| Elongation per inch under strain at elastic limit | do... | .001867 |
| Reduction in diameter at point of rupture (exterior) | do... | .068 |
| Position of rupture | | 1″.5 from neck |
| Character of broken surface | | fine granular |
| Elongation of inch sections | | ″.08, ″.20*, ″.09 |

## No. 6561.

Specimen, 9¼″ from breech.
Marks, (5) S.
Exterior diameter, ″.588.
Interior diameter, ″.300.
Sectional area, .20 square inch.
Gauged length, 3″.
Drilling of barrel suspended at location of this specimen.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000600 | .000300 | ..... | ..... | |
| 30,000 | .000933 | .000333 | ..... | ..... | |
| 40,000 | .001267 | .000334 | 0. | ..... | |
| 50,000 | .001633 | .000366 | ..... | ..... | |
| 54,000 | .001800 | .000167 | ..... | ..... | |
| 55,000 | .001867 | .000067 | ..... | ..... | Elastic limit. |
| 56,000 | .002500 | .000633 | ..... | ..... | |
| 57,000 | .004067 | .001567 | ..... | ..... | |
| 58,000 | .004600 | .000533 | ..... | ..... | |
| 59,000 | .005000 | .000400 | ..... | ..... | |
| 60,000 | .005567 | .000567 | ..... | ..... | |
| 62,000 | .006667 | .001100 | ..... | ..... | |
| 64,000 | .008000 | .001333 | ..... | ..... | |
| 68,000 | .010000 | .002000 | ..... | ..... | |
| 72,000 | .012233 | .002233 | ..... | ..... | |
| 76,000 | .014667 | .002434 | ..... | ..... | |
| 80,000 | .017000 | .002333 | ..... | ..... | |
| 84,000 | .020000 | .003000 | ..... | ..... | |
| 88,000 | .023000 | .003000 | ..... | ..... | |
| 92,000 | .026667 | .003667 | ..... | ..... | |
| 96,000 | .030000 | .003333 | ..... | ..... | |
| 100,000 | .034500 | .004500 | ..... | ..... | |
| 104,000 | .039667 | .005167 | ..... | ..... | |
| 108,000 | .047333 | .007666 | ..... | ..... | |
| 118,200 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 118,200 |
| Elastic limit per square inch of original section | do.... | 55,000 |
| Elongation per inch after rupture | inch.. | .1467 |
| Elongation per inch under strain at elastic limit | do.... | .001867 |
| Reduction in diameter at point of rupture (exterior) | do.... | .108 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | silky, interspersed with fine granulation |
| Elongation of inch sections | | ″.20*, ″.15, ″.09 |

## No. 6562.

Specimen, 12″ from breech.
Marks, (6) S.
Exterior diameter, ″.588.
Interior diameter, ″.300.
Sectional area, .20 square inch.
Gauged length, 3″.
Drilling of barrel suspended at location of this specimen.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 59,000 | .001967 | .000300 | ..... | ..... | |
| 60,000 | .002000 | .000033 | ..... | ..... | Elastic limit. |
| 61,000 | .002133 | .000133 | ..... | ..... | |
| 62,000 | .002300 | .000167 | ..... | ..... | |
| 63,000 | .002400 | .000100 | ..... | ..... | |
| 64,000 | .002600 | .000200 | ..... | ..... | |
| 66,000 | .003333 | .000733 | ..... | ..... | |
| 68,000 | .004167 | .000834 | ..... | ..... | |
| 70,000 | .004833 | .000666 | ..... | ..... | |
| 72,000 | .005600 | .000767 | ..... | ..... | |
| 76,000 | .007167 | .001567 | ..... | ..... | |
| 80,000 | .009067 | .001900 | ..... | ..... | |
| 84,000 | 010667 | .001600 | ..... | ..... | |
| 88,000 | .012667 | .002000 | ..... | ..... | |
| 92,000 | .014667 | .002000 | ..... | ..... | |
| 96,000 | .017167 | .002500 | ..... | ..... | |
| 100,000 | .019667 | .002500 | ..... | ..... | |
| 104,000 | .022667 | .003000 | ..... | ..... | |
| 108,000 | .025000 | .002333 | ..... | ..... | |
| 112,000 | .028333 | .003333 | ..... | ..... | |
| 116,000 | .031833 | .003500 | ..... | ..... | |
| 135,750 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 135,750 |
| Elastic limit per square inch of original section | do... | 60,000 |
| Elongation per inch after rupture | inch.. | .1133 |
| Elongation per inch under strain at elastic limit | do... | .002000 |
| Reduction in diameter at point of rupture (exterior) | do... | .068 |
| Position of rupture | | 1″.16 from neck |
| Character of broken surface | | fine granular |
| Elongation of inch sections | | ″.07, ″.14*, ″.13* |

## No. 6563.

Specimen, 13⅝″ from breech.
Marks, (7) S.
Exterior diameter, ″.588.
Interior diameter, ″.300.
Sectional area, .20 square inch.
Gauged length, 3″.
Drilling of barrel suspended at location of this specimen.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 58,000 | .001933 | .000266 | ..... | ..... | |
| 59,000 | .002000 | .000067 | ..... | ..... | Elastic limit. |
| 60,000 | .002433 | .000433 | ..... | ..... | |
| 61,000 | .002633 | .000200 | ..... | ..... | |
| 62,000 | .002833 | .000200 | ..... | ..... | |
| 63,000 | .003400 | .000567 | ..... | ..... | |
| 64,000 | .004333 | .000933 | ..... | ..... | |
| 68,000 | .006000 | .001667 | ..... | ..... | |
| 72,000 | .007833 | .001833 | ..... | ..... | |
| 76,000 | .009767 | .001934 | ..... | ..... | |
| 80,000 | .011667 | .001900 | ..... | ..... | |
| 84,000 | .014000 | .002333 | ..... | ..... | |
| 88,000 | .016167 | .002167 | ..... | ..... | |
| 92,000 | .018667 | .002500 | ..... | ..... | |
| 96,000 | .021333 | .002666 | ..... | ..... | |
| 100,000 | .024500 | .003167 | ..... | ..... | |
| 104,000 | .028000 | .003500 | ..... | ..... | |
| 108,000 | .031667 | .003667 | ..... | ..... | |
| 112,000 | .035667 | .004000 | ..... | ..... | |
| 116,000 | .040667 | .005000 | ..... | ..... | |
| 120,000 | .048000 | .007333 | ..... | ..... | |
| 128,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 128,900 |
| Elastic limit per square inch of original section | do... | 59,000 |
| Elongation per inch after rupture | inch.. | .1167 |
| Elongation per inch under strain at elastic limit | do... | .002000 |
| Reduction in diameter at point of rupture (exterior) | do... | .068 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | fine granular |
| Elongation of inch sections | | ″.16*, ″.12, ″.07 |

## No. 6564.

Breech specimen.
Marks, (8) G.
Exterior diameter, ".588.
Interior diameter, ".300.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial loads. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001633 | .000333 | 0. | ..... | |
| 60,000 | .002000 | .000367 | ..... | ..... | |
| 61,000 | .002033 | .000033 | ..... | ..... | |
| 62,000 | .002067 | .000034 | ..... | ..... | Elastic limit. |
| 63,000 | .002400 | .000333 | ..... | ..... | |
| 64,000 | .002667 | .000267 | ..... | ..... | |
| 65,000 | .003000 | .000333 | ..... | ..... | |
| 66,000 | .004000 | .001000 | ..... | ..... | |
| 68,000 | .006667 | .002667 | ..... | ..... | |
| 72,000 | .008700 | .002033 | ..... | ..... | |
| 76,000 | .010667 | .001967 | ..... | ..... | |
| 80,000 | .012833 | .002166 | ..... | ..... | |
| 84,000 | .015167 | .002334 | ..... | ..... | |
| 88,000 | .017333 | .002166 | ..... | ..... | |
| 92,000 | .020000 | .002667 | ..... | ..... | |
| 96,000 | .023000 | .003000 | ..... | ..... | |
| 100,000 | .025667 | .002667 | ..... | ..... | |
| 104,000 | .029000 | .003333 | ..... | ..... | |
| 108,500 | .033000 | .004000 | ..... | ..... | |
| 112,000 | .037500 | .004500 | ..... | ..... | |
| 116,000 | .043333 | .005833 | ..... | ..... | |
| 129,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 129,000 |
| Elastic limit per square inch of original section | do... | 62,000 |
| Elongation per inch after rupture | inch.. | .1500 |
| Elongation per inch under strain at elastic limit | do... | .002067 |
| Reduction in diameter at point of rupture (exterior) | do... | .098 |
| Position of rupture | | 1".5 from neck |
| Character of broken surface | | silky, interspersed with fine granulation |
| Elongation of inch sections | | ".13, ".24*, ".08 |

## No. 6565.

Specimen 17″.2 from breech.
Marks, (8) G.
Exterior diameter, ″.580.
Interior diameter, ″.300.
Sectional area, .1936 square inch.
Gauged length, 3″.
Drilling of barrel suspended at location of this specimen.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | 0. | ..... | |
| 50,000 | .001633 | .000333 | ..... | ..... | |
| 60,000 | .002000 | .000367 | ..... | ..... | |
| 65,000 | .002200 | .000200 | ..... | ..... | Elastic limit. |
| 66,000 | .002333 | .000133 | ..... | ..... | |
| 67,000 | .002633 | .000300 | ..... | ..... | |
| 68,000 | .003500 | .000833 | ..... | ..... | |
| 70,000 | .005000 | .001500 | ..... | ..... | |
| 72,000 | .005700 | .000700 | ..... | ..... | |
| 74,000 | .006767 | .001067 | ..... | ..... | |
| 76,000 | .007657 | .000900 | ..... | ..... | |
| 80,000 | .009667 | .001000 | ..... | ..... | |
| 84,000 | .011667 | .002000 | ..... | ..... | |
| 88,000 | .014000 | .002333 | ..... | ..... | |
| 92,000 | .016000 | .002000 | ..... | ..... | |
| 96,000 | .018500 | .002500 | ..... | ..... | |
| 100,000 | .021167 | .002667 | ..... | ..... | |
| 104,000 | .024167 | .003000 | ..... | ..... | |
| 108,000 | .027333 | .003166 | ..... | ..... | |
| 112,000 | .031000 | .003667 | ..... | ..... | |
| 129,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 129,100 |
| Elastic limit per square inch of original section | do... | 65,000 |
| Elongation per inch after rupture | inch.. | .1267 |
| Elongation per inch under strain at elastic limit | do... | .002200 |
| Reduction in diameter at point of rupture (exterior) | do... | .080 |
| Position of rupture | | 1″.04 from neck |
| Character of broken surface | | silky and fine granular metal interspersed |
| Elongation of inch sections | | ″.19*, ″.13, ″.06 |

## No. 6566.

Breech specimen.
Marks, (9) S.
Exterior diameter, ″.588.
Interior diameter, ″.300.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 48,000 | .001633 | .000300 | ..... | ..... | Elastic limit. |
| 49,000 | .002000 | .000367 | ..... | ..... | |
| 50,000 | .004433 | .000433 | ..... | ..... | |
| 51,000 | .005000 | .000567 | ..... | ..... | |
| 52,000 | .005500 | .000500 | ..... | ..... | |
| 54,000 | .006400 | .000900 | ..... | ..... | |
| 56,000 | .007667 | .001267 | ..... | ..... | |
| 60,000 | .009500 | .001833 | ..... | ..... | |
| 64,000 | .011667 | .002167 | ..... | ..... | |
| 68,000 | .014000 | .002333 | ..... | ..... | |
| 72,000 | .016667 | .002667 | ..... | ..... | |
| 76,000 | .018933 | .002266 | ..... | ..... | |
| 80,000 | .022000 | .003067 | ..... | ..... | |
| 84,000 | .025333 | .003333 | ..... | ..... | |
| 88,000 | .029167 | .003834 | ..... | ..... | |
| 92,000 | .033333 | .004166 | ..... | ..... | |
| 96,000 | .038333 | .005000 | ..... | ..... | |
| 100,000 | .044667 | .006334 | ..... | ..... | |
| 112,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 112,600 |
| Elastic limit per square inch of original section | do... | 48,000 |
| Elongation per inch after rupture | inch.. | .1400 |
| Elongation per inch under strain at elastic limit | do... | .001633 |
| Reduction in diameter at point of rupture (exterior) | do... | .078 |
| Position of rupture | | 1″.5 from neck |
| Character of broken surface | | fine granular |
| Elongation of inch sections | | ″.09, ″.21*, ″.12 |

## No. 6567.

Specimen, 23⅛″ from breech.
Marks, (9) S.
Exterior diameter, ″.588.
Interior diameter, ″.300.
Sectional area, .20 square inch.
Gauged length, 3″.
Drilling of barrel suspended at location of this specimen.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | 0. | ..... | |
| 49,000 | .001667 | .000334 | ..... | ..... | |
| 50,000 | .001733 | .000066 | ..... | ..... | |
| 51,000 | .001800 | .000067 | ..... | ..... | Elastic limit. |
| 52,000 | .002000 | .000200 | ..... | ..... | |
| 53,000 | .002133 | .000133 | ..... | ..... | |
| 54,000 | .002300 | .000167 | ..... | ..... | |
| 55,000 | .002433 | .000133 | ..... | ..... | |
| 56,000 | .002633 | .000200 | ..... | ..... | |
| 57,000 | .002767 | .000134 | ..... | ..... | |
| 58,000 | .003000 | .000233 | ..... | ..... | |
| 60,000 | .004333 | .001333 | ..... | ..... | |
| 62,000 | .005833 | .001500 | ..... | ..... | |
| 64,000 | .006667 | .000834 | ..... | ..... | |
| 68,000 | .008667 | .002000 | ..... | ..... | |
| 72,000 | .010667 | .002000 | ..... | ..... | |
| 76,000 | .013000 | .002333 | ..... | ..... | |
| 80,000 | .014833 | .001833 | ..... | ..... | |
| 84,000 | .017333 | .002500 | ..... | ..... | |
| 88,000 | .019833 | .002500 | ..... | ..... | |
| 92,000 | .022500 | .002667 | ..... | ..... | |
| 96,000 | .025667 | .003167 | ..... | ..... | |
| 100,000 | .029333 | .003666 | ..... | ..... | |
| 104,000 | .033000 | .003667 | ..... | ..... | |
| 108,000 | .038333 | .005333 | ..... | ..... | |
| 122,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 122,600 |
| Elastic limit per square inch of original section | do... | 51,000 |
| Elongation per inch after rupture | inch.. | .1100 |
| Elongation per inch under strain at elastic limit | do... | .001800 |
| Reduction in diameter at point of rupture (exterior) | do... | .068 |
| Position of rupture | | ″.7 from neck |
| Character of broken surface | | fine granular |
| Elongation of inch sections | | ″.18*, ″.09, ″.06 |

## No. 6568.

Breech specimen.
Marks, (10) S.
Exterior diameter, ".588.
Interior diameter, ".300.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | 0. | ..... | |
| 50,000 | .001667 | .000367 | ..... | ..... | Elastic limit. |
| 51,000 | .001767 | .000100 | ..... | ..... | |
| 52,000 | .002400 | .000633 | ..... | ..... | |
| 53,000 | .002833 | .000433 | ..... | ..... | |
| 54,000 | .003400 | .000567 | ..... | ..... | |
| 55,000 | .003733 | .000333 | ..... | ..... | |
| 56,000 | .004100 | .000367 | ..... | ..... | |
| 58,000 | .005000 | .000900 | ..... | ..... | |
| 60,000 | .005833 | .000833 | ..... | ..... | |
| 64,000 | .007667 | .000834 | ..... | ..... | |
| 68,000 | .009667 | .002000 | ..... | ..... | |
| 72,000 | .011667 | .002000 | ..... | ..... | |
| 76,000 | .014000 | .002333 | ..... | ..... | |
| 80,000 | .016667 | .002667 | ..... | ..... | |
| 84,000 | .018333 | .001666 | ..... | ..... | |
| 88,000 | .021667 | .003334 | ..... | ..... | |
| 92,000 | .024667 | .003000 | ..... | ..... | |
| 96,000 | .027833 | .003166 | ..... | ..... | |
| 100,000 | .031833 | .003500 | ..... | ..... | |
| 104,000 | .036000 | .004667 | ..... | ..... | |
| 108,000 | .040667 | .004667 | ..... | ..... | |
| 112,000 | .046667 | .006000 | ..... | ..... | |
| 121,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 121,500 |
| Elastic limit per square inch of original section | do... | 50,000 |
| Elongation per inch after rupture | inch.. | .1200 |
| Elongation per inch under strain at elastic limit | do... | .001667 |
| Reduction in diameter at point of rupture | do... | .068 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine granular |
| Elongation of inch sections | | ".10, ".17*, ".09 |

## No. 6569.

Specimen, 27″ from breech.
Marks, (10) S.
Exterior diameter, ″.588.
Interior diameter, ″.300.
Sectional area, .20 square inch.
Gauged length, 3″.
Drilling of barrel suspended at location of this specimen.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | 0. | ..... | |
| 50,000 | .001667 | .000367 | ..... | ..... | |
| 55,000 | .001800 | .000133 | ..... | ..... | |
| 56,000 | .001867 | .000067 | ..... | ..... | |
| 57,000 | .001933 | .000066 | ..... | ..... | |
| 58,000 | .001967 | .000031 | ..... | ..... | Elastic limit. |
| 59,000 | .002200 | .000233 | ..... | ..... | |
| 60,000 | .002567 | .000367 | ..... | ..... | |
| 61,000 | .003167 | .000600 | ..... | ..... | |
| 62,000 | .004067 | .000900 | ..... | ..... | |
| 64,000 | .004800 | .000733 | ..... | ..... | |
| 68,000 | .006600 | .001800 | ..... | ..... | |
| 72,000 | .008333 | .001733 | ..... | ..... | |
| 76,000 | .010233 | .001900 | ..... | ..... | |
| 80,000 | .012333 | .002100 | ..... | ..... | |
| 84,000 | .014333 | .002000 | ..... | ..... | |
| 88,000 | .016667 | .002334 | ..... | ..... | |
| 92,000 | .019167 | .002500 | ..... | ..... | |
| 96,000 | .021767 | .002600 | ..... | ..... | |
| 100,000 | .024667 | .002900 | ..... | ..... | |
| 104,000 | .028000 | .003333 | ..... | ..... | |
| 108,000 | .032000 | .004000 | ..... | ..... | |
| 112,000 | .036333 | .004333 | ..... | ..... | |
| 128,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 128,900 |
| Elastic limit per square inch of original section | do... | 58,000 |
| Elongation per inch after rupture | inch.. | .1467 |
| Elongation per inch under strain at elastic limit | do... | .001967 |
| Reduction in diameter at point of rupture (exterior) | do... | .078 |
| Position of rupture | | ″.7 from neck |
| Character of broken surface | | fine granular |
| Elongation of inch sections | | ″.06, ″.09, ″.19* |

## No. 6583.

Breech specimen, annealed at low heat in lime.
Marks, (5) S.
Exterior diameter, ".588.
Interior diameter, ".300.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | 0. | ..... | |
| 50,000 | .001667 | .000367 | ..... | ..... | |
| 55,000 | .001867 | .000200 | ..... | ..... | Elastic limit. |
| | .003067 | .001200 | ..... | ..... | |
| 56,000 | .004000 | .000933 | ..... | ..... | |
| 57,000 | .005500 | .001500 | ..... | ..... | |
| 58,000 | .007167 | .001667 | ..... | ..... | |
| 60,000 | .008000 | .000833 | ..... | ..... | |
| 64,000 | .010333 | .002333 | ..... | ..... | |
| 68,000 | .012833 | .002500 | ..... | ..... | |
| 72,000 | .015333 | .002500 | ..... | ..... | |
| 76,000 | .017667 | .002334 | ..... | ..... | |
| 80,000 | .020833 | .003166 | ..... | ..... | |
| 84,000 | .024333 | .003500 | ..... | ..... | |
| 88,000 | .028000 | .003667 | ..... | ..... | |
| 92,000 | .032333 | .004333 | ..... | ..... | |
| 96,000 | .037333 | .005000 | ..... | ..... | |
| 100,000 | .043667 | .006334 | ..... | ..... | |
| 104,000 | .051667 | .008000 | ..... | ..... | |
| 113,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 113,000 |
| Elastic limit per square inch of original section | do... | 55,000 |
| Elongation per inch after rupture | inch.. | .1567 |
| Elongation per inch under strain at elastic limit | do... | .001867 |
| Reduction in diameter at point of rupture (exterior) | do... | .108 |
| Position of rupture | | 1".18 from neck |
| Character of broken surface | | silky, interspersed with fine granulation |
| Elongation of inch sections | | ".08, ".21*, ".18* |

## No. 6584.

Breech specimen, annealed at heat above specimen (5) S, in lime.
Marks, (6) S.
Exterior diameter, ".588.
Interior diameter, ".300.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | 0. | ..... | |
| 50,000 | .001667 | .000367 | ..... | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 63,000 | .002100 | .000100 | ..... | ..... | Elastic limit. |
| 64,000 | .002667 | .000567 | ..... | ..... | |
| 65,000 | .005333 | .002666 | ..... | ..... | |
| 66,000 | .005667 | .000334 | ..... | ..... | |
| 68,000 | .006333 | .000666 | ..... | ..... | |
| 72,000 | .008333 | .002000 | ..... | ..... | |
| 76,000 | .010333 | .002000 | ..... | ..... | |
| 80,000 | .012333 | .002000 | ..... | ..... | |
| 84,000 | .014333 | .002000 | ..... | ..... | |
| 88,000 | .016667 | .002334 | ..... | ..... | |
| 92,000 | .019000 | .002333 | ..... | ..... | |
| 96,000 | .021667 | .002667 | ..... | ..... | |
| 100,000 | .024667 | .003000 | ..... | ..... | |
| 104,000 | .027333 | .002666 | ..... | ..... | |
| 108,000 | .030833 | .003500 | ..... | ..... | |
| 131,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 131,900 |
| Elastic limit per square inch of original section | do... | 63,000 |
| Elongation per inch after rupture | inch.. | .1433 |
| Elongation per inch under strain at elastic limit | do... | .002100 |
| Reduction in diameter at point of rupture (exterior) | do... | .108 |
| Position of rupture | | ".8 from neck |
| Character of broken surface | | fine granular |
| Elongation of inch sections | | ".10, ".11, ".22* |

## No. 6585.

Breech specimen, annealed at heat above specimen (6) S, in lime.
Marks, (7) S.
Exterior diameter, ".588.
Interior diameter, ".300.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | ..... | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | Elastic limit. |
| 61,000 | .003000 | .001000 | ..... | ..... | |
| 62,000 | .003667 | .000667 | ..... | ..... | |
| 63,000 | .004333 | .000666 | ..... | ..... | |
| 64,000 | .005500 | .001167 | ..... | ..... | |
| 68,000 | .007333 | .001833 | ..... | ..... | |
| 72,000 | .009333 | .002000 | ..... | ..... | |
| 76,000 | .011667 | .002334 | ..... | ..... | |
| 80,000 | .013667 | .002000 | ..... | ..... | |
| 84,000 | .016000 | .002334 | ..... | ..... | |
| 88,000 | .018333 | .002333 | ..... | ..... | |
| 92,000 | .020733 | .002400 | ..... | ..... | |
| 96,000 | .023833 | .003100 | ..... | ..... | |
| 100,000 | .026833 | .003000 | ..... | ..... | |
| 104,000 | .030400 | .003567 | ..... | ..... | |
| 108,000 | .034667 | .004267 | ..... | ..... | |
| 112,000 | .039333 | .004666 | ..... | ..... | |
| 126,100 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 126,100 |
| Elastic limit per square inch of original section | do... | 60,000 |
| Elongation per inch after rupture | inch.. | .1233 |
| Elongation per inch under strain at elastic limit | do... | .002000 |
| Reduction in diameter at point of rupture (exterior) | do... | .108 |
| Position of rupture | | ".5 from neck |
| Character of broken surface | | silky, interspersed with fine granulation |
| Elongation of inch sections | | ".06, ".07, ".24* |

## No. 6586.

Specimen near muzzle end, annealed in lime.
Marks, (1) S.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000800 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001633 | .000333 | 0. | ..... | |
| 60,000 | .001967 | .000334 | ..... | ..... | |
| 61,000 | .002000 | .000333 | ..... | ..... | Elastic limit. |
| 62,000 | .004167 | .002167 | ..... | ..... | |
| 63,000 | .004933 | .000766 | ..... | ..... | |
| 64,000 | .006000 | .001067 | ..... | ..... | |
| 66,000 | .007233 | .001233 | ..... | ..... | |
| 68,000 | .007833 | .000600 | ..... | ..... | |
| 72,000 | .010167 | .002334 | ..... | ..... | |
| 76,000 | .012667 | .002500 | ..... | ..... | |
| 80,000 | .014667 | .002000 | ..... | ..... | |
| 84,000 | .017167 | .002500 | ..... | ..... | |
| 88,000 | .019667 | .002500 | ..... | ..... | |
| 92,000 | .022333 | .002666 | ..... | ..... | |
| 96,000 | .025833 | .003500 | ..... | ..... | |
| 100,000 | .029000 | .003167 | ..... | ..... | |
| 104,000 | .033000 | .004000 | ..... | ..... | |
| 108,000 | .037667 | .004667 | ..... | ..... | |
| 112,000 | .043333 | .005666 | ..... | ..... | |
| 125,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 125,100 |
| Elastic limit per square inch of original section | do... | 61,000 |
| Elongation per inch after rupture | inch.. | .1433 |
| Elongation per inch under strain at elastic limit | do... | .002000 |
| Reduction in diameter at point of rupture | do... | .115 |
| Reduction in area after rupture, per cent of original section | | 40.8 |
| Position of rupture | | ″.65 from neck |
| Character of broken surface | | fine silky, trace of granulation |
| Elongation of inch sections | | ″.06, ″.09, ″.28* |

## No. 6587.

Specimen near muzzle end, annealed in lime.
Marks, (2) S.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 61,000 | .002033 | .000033 | ..... | ..... | |
| 62,000 | .002067 | .000034 | ..... | ..... | |
| 63,000 | .002100 | .000033 | ..... | ..... | |
| 64,000 | .002133 | .000033 | ..... | ..... | Elastic limit. |
| 65,000 | .002667 | .000534 | ..... | ..... | |
| 66,000 | .004000 | .001333 | ..... | ..... | |
| 67,000 | .004700 | .000700 | ..... | ..... | |
| 68,000 | .005333 | .000633 | ..... | ..... | |
| 72,000 | .007333 | .002000 | ..... | ..... | |
| 76,000 | .009000 | .001667 | ..... | ..... | |
| 80,000 | .011000 | .002000 | ..... | ..... | |
| 84,000 | .013000 | .002000 | ..... | ..... | |
| 88,000 | .015167 | .002167 | ..... | ..... | |
| 92,000 | .017333 | .002166 | ..... | ..... | |
| 96,000 | .020000 | .002667 | ..... | ..... | |
| 100,000 | .022167 | .002167 | ..... | ..... | |
| 104,000 | .025333 | .002166 | ..... | ..... | |
| 108,000 | .028667 | .003334 | ..... | ..... | |
| 112,000 | .032000 | .003333 | ..... | ..... | |
| 132,550 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 132,550 |
| Elastic limit per square inch of original section | do... | 64,000 |
| Elongation per inch after rupture | inch.. | .1400 |
| Elongation per inch under strain at elastic limit | do.. | .002133 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 84.0 |
| Position of rupture | | ".9 from neck |
| Character of broken surface | | silky, interspersed with fine granulation |
| Elongation of inch sections | | ".23*, ".10, ".09 |

## No. 6588.

Specimen near muzzle end, annealed in lime.
Marks, (3) S.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000800 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002033 | .000366 | ..... | ..... | |
| 64,000 | .002233 | .000200 | ..... | ..... | |
| 65,000 | .002300 | .000067 | ..... | ..... | |
| 66,000 | .002333 | .000033 | ..... | ..... | Elastic limit. |
| 67,000 | .006667 | .004334 | ..... | ..... | |
| 68,000 | .007333 | .000666 | ..... | ..... | |
| 70,000 | .008000 | .000667 | ..... | ..... | |
| 72,000 | .009000 | .001000 | ..... | ..... | |
| 76,000 | .011500 | .002500 | ..... | ..... | |
| 80,000 | .013333 | .001833 | ..... | ..... | |
| 84,000 | .016000 | .002667 | ..... | ..... | |
| 88,000 | .018333 | .002333 | ..... | ..... | |
| 92,000 | .021000 | .002667 | ..... | ..... | |
| 96,000 | .023833 | .002833 | ..... | ..... | |
| 100,000 | .027000 | .003167 | ..... | ..... | |
| 104,000 | .030333 | .003333 | ..... | ..... | |
| 108,000 | .034667 | .004334 | ..... | ..... | |
| 112,000 | .039333 | .004666 | ..... | ..... | |
| 127,000 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 127,000 |
| Elastic limit per square inch of original section | do... | 66,000 |
| Elongation per inch after rupture | inch.. | .1500 |
| Elongation per inch under strain at elastic limit | do... | .002333 |
| Reduction in diameter at point of rupture | do... | .125 |
| Reduction in area after rupture, per cent of original section | | 43.3 |
| Position of rupture | | ".6 from neck |
| Character of broken surface | | silky, trace of granulation |
| Elongation of inch sections | | ".09, ".09, ".27* |

## No. 6601.

Piece of barrel heated low red and swaged down to $\frac{5}{4}$-inch diameter. Reheated and annealed in charcoal.

Marks, (1) S.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000367 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001367 | .000367 | ..... | ..... | |
| 50,000 | .001700 | .000333 | ..... | ..... | |
| 60,000 | .002100 | .000400 | ..... | ..... | |
| 65,000 | .002300 | .000200 | 0. | ..... | |
| 68,000 | .002433 | .000133 | ..... | ..... | Elastic limit. |
| 69,000 | .010000 | .007567 | ..... | ..... | |
| 70,000 | .010667 | .000667 | ..... | ..... | |
| 72,000 | .011667 | .001000 | ..... | ..... | |
| 74,000 | .012333 | .000666 | ..... | ..... | |
| 76,000 | .013667 | .001334 | ..... | ..... | |
| 80,000 | .016333 | .002666 | ..... | ..... | |
| 84,000 | .019167 | .002834 | ..... | ..... | |
| 88,000 | .022333 | .003166 | ..... | ..... | |
| 92,000 | .025267 | .002934 | ..... | ..... | |
| 96,000 | .029000 | .003733 | ..... | ..... | |
| 100,000 | .032833 | .003833 | ..... | ..... | |
| 104,000 | .037833 | .005000 | ..... | ..... | |
| 108,000 | .043667 | .005834 | ..... | ..... | |
| 112,000 | .052333 | .008666 | ..... | ..... | |
| 122,050 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 122,050 |
| Elastic limit per square inch of original section | do... | 68,000 |
| Elongation per inch after rupture | inch.. | .1733 |
| Elongation per inch under strain at elastic limit | do... | .002433 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1″.35 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.10; ″.30*, ″.12 |

## No. 6602.

Specimen treated the same as No. 6601.
Marks, (2) S.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001700 | .000367 | ..... | ..... | |
| 60,000 | .002067 | .000367 | ..... | ..... | |
| 68,000 | .002300 | .000233 | ..... | ..... | |
| 69,000 | .002367 | .000067 | ..... | ..... | Elastic limit. |
| | .012000 | .009633 | ..... | ..... | |
| 70,000 | .012200 | .000200 | ..... | ..... | |
| 72,000 | .012533 | .000333 | ..... | ..... | |
| 76,000 | .014333 | .001800 | ..... | ..... | |
| 80,000 | .016667 | .002334 | ..... | ..... | |
| 84,000 | .019333 | .002666 | ..... | ..... | |
| 88,000 | .022333 | .003000 | ..... | ..... | |
| 92.000 | .025333 | .003000 | ..... | ..... | |
| 96,000 | .029000 | .003667 | ..... | ..... | |
| 100,000 | .033000 | .004000 | ..... | ..... | |
| 104,000 | .037667 | .004667 | ..... | ..... | |
| 108,000 | .043333 | .005666 | ..... | ..... | |
| 112,000 | .051667 | .008334 | ..... | ..... | |
| 121,850 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 121,850 |
| Elastic limit per square inch of original section | do... | 69,000 |
| Elongation per inch after rupture | inch.. | .1767 |
| Elongation per inch under strain at elastic limit | do... | .002367 |
| Reduction in diameter at po.nt of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.09, ″.13, ″.31* |

## No. 6603.

Specimen treated in same manner as No. 6601.
Marks, (3) S.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001367 | .000367 | ..... | ..... | |
| 50,000 | .001733 | .000366 | ..... | ..... | |
| 60,000 | .002067 | .000334 | ..... | ..... | |
| 69,000 | .002400 | .000333 | ..... | ..... | |
| 70,000 | .002433 | .000033 | ..... | ..... | |
| 71,000 | .002500 | .000067 | ..... | ..... | |
| 72.000 | .002583 | .000033 | ..... | ..... | Elastic limit. |
| 73,000 | .011333 | .008800 | ..... | ..... | |
| 74,000 | .011933 | .000600 | ..... | ..... | |
| 76,000 | .013000 | .001067 | ..... | ..... | |
| 80,000 | .016000 | .003000 | ..... | ..... | |
| 84,000 | .019000 | .003000 | ..... | ..... | |
| 88,000 | .021667 | .002667 | ..... | ..... | |
| 92,000 | .025000 | .003333 | ..... | ..... | |
| 96,000 | .029000 | .004000 | ..... | ..... | |
| 100,000 | .032667 | .003667 | ..... | ..... | |
| 104,000 | .038667 | .006000 | ..... | ..... | |
| 108,000 | .045833 | .006666 | ..... | ..... | |
| 112,000 | .055000 | .009667 | ..... | ..... | |
| 119,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 119,600 |
| Elastic limit per square inch of original section | do... | 72,000 |
| Elongation per inch after rupture | inch.. | .1767 |
| Elongation per inch under strain at elastic limit | do... | .002583 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | ".85 from neck |
| Character of broken surface | | fine silky, serrated |
| Elongation of inch sections | | ".08, ".12, ".33* |

## No. 6604.

Section of barrel annealed in charcoal.
Marks, (6) S.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001033 | .000366 | ..... | ..... | |
| 40,000 | .001400 | .000367 | ..... | ..... | |
| 50,000 | .001733 | .000333 | ..... | ..... | |
| 60,000 | .002100 | .000367 | ..... | ..... | |
| 63,000 | .002267 | .000167 | ..... | ..... | |
| 64,000 | .002300 | .000033 | ..... | ..... | Elastic limit. |
| | .006333 | .004033 | ..... | ..... | |
| 65,000 | .009067 | .002734 | ..... | ..... | |
| 66,000 | .009500 | .000433 | ..... | ..... | |
| 68,000 | .010333 | .000833 | ..... | ..... | |
| 72,000 | .013333 | .003000 | ..... | ..... | |
| 76,000 | .015000 | .001667 | ..... | ..... | |
| 80,000 | .017000 | .002000 | ..... | ..... | |
| 84,000 | .020000 | .003000 | ..... | ..... | |
| 88,000 | .022333 | .002333 | ..... | ..... | |
| 92,000 | .025333 | .003000 | ..... | ..... | |
| 96,000 | .028667 | .003334 | ..... | ..... | |
| 100,000 | .032333 | .003666 | ..... | ..... | |
| 104,000 | .036333 | .004000 | ..... | ..... | |
| 108,000 | .041667 | .005334 | ..... | ..... | |
| 112,000 | .048667 | .007000 | ..... | ..... | |
| 123,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 123,000 |
| Elastic limit per square inch of original section | do... | 64,000 |
| Elongation per inch after rupture | inch.. | .1433 |
| Elongation per inch under strain at elastic limit | do... | .002300 |
| Reduction in diameter at point of rupture | do... | .125 |
| Reduction in area after rupture, per cent of original section | | 48.3 |
| Position of rupture | | ".5 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".27*, ".08, ".08 |

## No. 6605.

Treated in same manner as No. 6604, but heated to higher temperature for annealing.

Marks, (6) S.
Diameter, ".500.
Sectional area, .196 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000367 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001367 | .000367 | ..... | ..... | |
| 50,000 | .001733 | .000366 | ..... | ..... | |
| 58,000 | ..... | ..... | ..... | ..... | Elastic limit, approximate. |
| 60,000 | .005433 | .003700 | ..... | ..... | |
| 61,000 | .006333 | .000900 | ..... | ..... | |
| 62,000 | .006733 | .000400 | ..... | ..... | |
| 64,000 | .007433 | .000700 | ..... | ..... | |
| 68,000 | .009833 | .002400 | ..... | ..... | |
| 72,000 | .011500 | .001667 | ..... | ..... | |
| 76,000 | .013400 | .001900 | ..... | ..... | |
| 80,000 | .015767 | .002367 | ..... | ..... | |
| 84,000 | .017833 | .002066 | ..... | ..... | |
| 88,000 | .021000 | .003167 | ..... | ..... | |
| 92,000 | .022667 | .001667 | ..... | ..... | |
| 96,000 | .026067 | .003400 | ..... | ..... | |
| 100,000 | .029667 | .003600 | ..... | ..... | |
| 104,000 | .033667 | .004000 | ..... | ..... | |
| 108,000 | .038000 | .004333 | ..... | ..... | |
| 112,000 | .043667 | .005667 | ..... | ..... | |
| 127,040 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 127,040 |
| Elastic limit per square inch of original section (approximate) | do... | 58,000 |
| Elongation per inch after rupture | inch.. | .1600 |
| Reduction in diameter at point of rupture | do... | .080 |
| Reduction in area after rupture, per cent of original section | | 29.3 |
| Position of rupture | | 1".14 from neck |
| Character of broken surface | | granular, radiating from a silky spot in the circumference |
| Elongation of inch sections | | ".10, ".21*, ".17* |

## No. 6606.

Treated the same as No. 6604.
Marks, (8) G.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001700 | .000367 | ..... | ..... | |
| 60,000 | .002067 | .000367 | ..... | ..... | |
| 70,000 | .002433 | .000366 | ..... | ..... | Elastic limit. |
| | .012000 | .009567 | ..... | ..... | |
| 71,000 | .012500 | .000500 | ..... | ..... | |
| 72,000 | .012867 | .000367 | ..... | ..... | |
| 76,000 | .015000 | .002133 | ..... | ..... | |
| 80,000 | .017167 | .002167 | ..... | ..... | |
| 84,000 | .020000 | .002833 | ..... | ..... | |
| 88,000 | .022667 | .002667 | ..... | ..... | |
| 92,000 | .025667 | .003000 | ..... | ..... | |
| 96,000 | .029333 | .003666 | ..... | ..... | |
| 100,000 | .033667. | .004334 | ..... | ..... | |
| 104,000 | .038000 | .004333 | ..... | ..... | |
| 108,000 | .044333 | .006333 | ..... | ..... | |
| 112,000 | .052000 | .007667 | ..... | ..... | |
| 121,500 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 121,500 |
| Elastic limit per square inch of original section | do... | 70,000 |
| Elongation per inch after rupture | inch.. | .1733 |
| Elongation per inch under strain at elastic limit | do... | .002433 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | ″.85 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.09, ″.13, ″.30* |

## No. 6624.

Oil tempered and annealed.
Marks, (4) S.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002367 | .000367 | ..... | ..... | |
| 80,000 | .002733 | .000366 | ..... | ..... | |
| 81,000 | .002800 | .000067 | ..... | ..... | Elastic limit. |
| 82,000 | .002900 | .000100 | ..... | ..... | |
| 83,000 | .005667 | .002767 | ..... | ..... | |
| 84,000 | .006167 | .000500 | ..... | ..... | |
| 85,000 | .008000 | .001833 | ..... | ..... | |
| 86,000 | .009500 | .001500 | ..... | ..... | |
| 88,000 | .023333 | .013833 | ..... | ..... | |
| 92,000 | .026667 | .003334 | ..... | ..... | |
| 96,000 | .032667 | .006000 | ..... | ..... | |
| 100,000 | .038333 | .005666 | ..... | ..... | |
| 114,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 114,450 |
| Elastic limit per square inch of original section | do... | 81,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .002800 |
| Reduction in diameter at point of rupture | do... | .185 |
| Reduction in area after rupture, per cent of original section | | 59.8 |
| Position of rupture | | ".55 from neck |
| Character of broken surface | | fine silky, serrated |
| Elongation of inch sections | | ".10, ".11, ".36* |

## No. 6625.

Oil tempered and annealed.
Marks, (5) S.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001700 | .000367 | ..... | ..... | |
| 60,000 | .002033 | .000333 | ..... | ..... | |
| 70,000 | .002400 | .000367 | ..... | ..... | |
| 80,000 | .002733 | .000333 | ..... | ..... | |
| 90,000 | .003100 | .000367 | ..... | ..... | |
| 100,000 | .003533 | .000433 | ..... | ..... | |
| 105,000 | .003667 | .000134 | ..... | ..... | |
| 106,000 | .003700 | .000033 | ..... | ..... | |
| 107,000 | .003733 | .000033 | ..... | ..... | Elastic limit. |
| 108,000 | .003867 | .000134 | ..... | ..... | |
| 109,000 | .007667 | .003800 | ..... | ..... | |
| 110,000 | .010000 | .002333 | ..... | ..... | |
| 127,600 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 127,600 |
| Elastic limit per square inch of original section | do... | 107,000 |
| Elongation per inch after rupture | inch.. | .1433 |
| Elongation per inch under strain at elastic limit | do... | .003733 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | ".55 from neck |
| Character of broken surface | | fine silky, serrated |
| Elongation of inch sections | | ".31*, ".06, ".06 |

## No. 6626.

Oil tempered and annealed.
Marks, (7) S.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000333 | .000266 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002033 | .000366 | ..... | ..... | |
| 70,000 | .002367 | .000334 | ..... | ..... | |
| 80,000 | .002733 | .000366 | ..... | ..... | |
| 90,000 | .003067 | .000334 | ..... | ..... | |
| 95,000 | .003267 | .000200 | ..... | ..... | |
| 100,000 | .003433 | .000166 | ..... | ..... | |
| 105,000 | .003600 | .000167 | ..... | ..... | |
| 110,000 | .003767 | .000167 | ..... | ..... | |
| 115,000 | .003967 | .000200 | ..... | ..... | |
| 118,000 | .004100 | .000133 | ..... | ..... | Elastic limit. |
| 119,000 | .004300 | .000200 | ..... | ..... | |
| 120,000 | .004400 | .000100 | .000100 | .000100 | |
| 121,000 | .004700 | .000300 | ..... | ..... | |
| 122,000 | .005367 | .000667 | ..... | ..... | |
| 123,000 | .006333 | .000966 | ..... | ..... | |
| 124,000 | .007500 | .001167 | ..... | ..... | |
| 125,000 | .009667 | .002167 | ..... | ..... | |
| 143,500 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 143,500 |
| Elastic limit per square inch of original section | do... | 118,000 |
| Elongation per inch after rupture | inch.. | .1200 |
| Elongation per inch under strain at elastic limit | do... | .004100 |
| Reduction in diameter at point of rupture | do... | .115 |
| Reduction in area after rupture, per cent of original section | | 40.8 |
| Position of rupture | | ".45 from neck |
| Character of broken surface | | fine silky, irregular surface, serrated |
| Elongation of inch sections | | ".05, ".06, ".25* |

## No. 6630.

Oil tempered and annealed at low heat.
Marks, (7) S.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002367 | .000367 | ..... | ..... | |
| 80,000 | .002700 | .000333 | ..... | ..... | |
| 90,000 | .003033 | .000333 | ..... | ..... | |
| 100,000 | .003400 | .000367 | ..... | ..... | |
| 110,000 | .003767 | .000367 | ..... | ..... | |
| 115,000 | .003933 | .000166 | ..... | ..... | |
| 120,000 | .004100 | .000167 | ..... | ..... | |
| 125,000 | .004300 | .000200 | ..... | ..... | |
| 130,000 | .004467 | .000167 | ..... | ..... | Elastic limit. |
| 131,000 | .018333 | .018866 | ..... | ..... | |
| 132,000 | .019667 | .001334 | ..... | ..... | |
| 133,000 | .020667 | .001000 | ..... | ..... | |
| 147,050 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 147,050 |
| Elastic limit per square inch of original section | do... | 130,000 |
| Elongation per inch after rupture | inch.. | .1133 |
| Elongation per inch under strain at elastic limit | do... | .004467 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 84.0 |
| Position of rupture | | 1″.13 from neck |
| Character of broken surface | | fine silky, cup shaped, serrated |
| Elongation of inch sections | | ″.06, ″.17*, ″.12* |

## No. 6639.

Oil tempered at low heat and annealed at high heat.
Marks, (5) S.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000367 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001833 | .000333 | ..... | ..... | |
| 50,000 | .001700 | .000367 | 0. | ..... | |
| 60,000 | .002067 | .000367 | ..... | ..... | |
| 66,000 | .002300 | .000233 | ..... | ..... | Elastic limit. |
| 67,000 | .010167 | .007867 | ..... | ..... | |
| 68,000 | .010400 | .000233 | ..... | ..... | |
| 70,000 | .010667 | .000267 | ..... | ..... | |
| 72,000 | .011667 | .001000 | ..... | ..... | |
| 76,000 | .014333 | .002666 | ..... | ..... | |
| 80,000 | .017000 | .002667 | ..... | ..... | |
| 84,000 | .020000 | .003000 | ..... | ..... | |
| 88,000 | .022667 | .002667 | ..... | ..... | |
| 92,000 | .026333 | .003666 | ..... | ..... | |
| 96,000 | .030167 | .003834 | ..... | ..... | |
| 100,000 | .034000 | .003833 | ..... | ..... | |
| 104,000 | .039000 | .005000 | ..... | ..... | |
| 108,000 | .047000 | .008000 | ..... | ..... | |
| 119,700 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 119,700 |
| Elastic limit per square inch of original section | do... | 66,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .002300 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | ".75 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".32*, ".12, ".13 |

## No. 6640.

Oil tempered at low heat, annealed at bright cherry color.
Marks, (5) S.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000367 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001700 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000300 | ..... | ..... | |
| 70,000 | .002367 | .000367 | ..... | ..... | |
| 73,000 | .002433 | .000066 | ..... | ..... | |
| 74,000 | .002467 | .000034 | ..... | ..... | Elastic limit. |
| 75,000 | .021333 | .018866 | ..... | ..... | |
| 76,000 | .022000 | .000667 | ..... | ..... | |
| 78,000 | .023267 | .001267 | ..... | ..... | |
| 80,000 | .025333 | .002066 | ..... | ..... | |
| 84,000 | .029333 | .004000 | ..... | ..... | |
| 88,000 | .034167 | .004834 | ..... | ..... | |
| 92,000 | .041000 | .006833 | ..... | ..... | |
| 96,000 | .048000 | .007000 | ..... | ..... | |
| 100,000 | .058667 | .010667 | ..... | ..... | |
| 108,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 108,500 |
| Elastic limit per square inch of original section | do... | 74,000 |
| Elongation per inch after rupture | inch.. | .2167 |
| Elongation per inch under strain at elastic limit | do... | .002467 |
| Reduction in diameter at point of rupture | do... | .195 |
| Reduction in area after rupture, per cent of original section | | 62.2 |
| Position of rupture | | 1" from neck |
| Character of broken surface | | fine, silky |
| Elongation of inch sections | | ".38*, ".15, ".12 |

## No. 6723.

Marks, (4) S.
Heated a low red and cooled in oil.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000333 | .000266 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001033 | .000366 | ..... | ..... | |
| 40,000 | .001433 | .000400 | .000033 | .000033 | |
| 50,000 | .001800 | .000367 | ..... | ..... | |
| 60,000 | .002167 | .000367 | .000033 | 0. | |
| 70,000 | .002533 | .000366 | ..... | ..... | Elastic limit. |
| 71,000 | .005000 | .002467 | ..... | ..... | |
| 72,000 | .007067 | .002067 | ..... | ..... | |
| 73,000 | .007667 | .000600 | ..... | ..... | |
| 74,000 | .008167 | .000500 | ..... | ..... | |
| 76,000 | .009500 | .001333 | ..... | ..... | |
| 80,000 | .011667 | .002167 | ..... | ..... | |
| 84,000 | .014000 | .002333 | ..... | ..... | |
| 88,000 | .016333 | .002333 | ..... | ..... | |
| 92,000 | .018667 | .002334 | ..... | ..... | |
| 96,000 | .021333 | .002666 | ..... | ..... | |
| 100,000 | .024333 | .003000 | ..... | ..... | |
| 104,000 | .027667 | .003334 | ..... | ..... | |
| 108,000 | .031333 | .003666 | ..... | ..... | |
| 112,000 | .035500 | .004167 | ..... | ..... | |
| 129,800 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 129,800 |
| Elastic limit per square inch of original section | do... | 70,000 |
| Elongation per inch after rupture | inch.. | .1733 |
| Elongation per inch under strain at elastic limit | do... | .002533 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | 1".4 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ".16, ".26, * ".10 |

## No. 6724.

Marks, (4) S.
Heated bright red and cooled in air blast.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | ..... | ..... | |
| 10,000 | .000267 | .000200 | ..... | ..... | |
| 20,000 | .000567 | .000300 | ..... | ..... | |
| 30,000 | .000900 | .000333 | ..... | ..... | |
| 40,000 | .001233 | .000333 | ..... | ..... | |
| 50,000 | .001567 | .000334 | ..... | ..... | |
| 60,000 | .001967 | .000400 | ..... | ..... | |
| 68,000 | .002300 | .000333 | ..... | ..... | Elastic limit. |
| | .004333 | .002033 | ..... | ..... | |
| 69,000 | .006333 | .002000 | ..... | ..... | |
| 70,000 | .006900 | .000567 | ..... | ..... | |
| 72,000 | .008000 | .001100 | ..... | ..... | |
| 76,000 | .010267 | .002267 | ..... | ..... | |
| 80,000 | .012500 | .002233 | ..... | ..... | |
| 84,000 | .014833 | .002333 | ..... | ..... | |
| 88,000 | .017333 | .002500 | ..... | ..... | |
| 92,000 | .020000 | .002667 | ..... | ..... | |
| 96,000 | .022833 | .002833 | ..... | ..... | |
| 100,000 | .026000 | .003167 | ..... | ..... | |
| 104,000 | .029333 | .003333 | ..... | ..... | |
| 108,000 | .033333 | .004000 | ..... | ..... | |
| 112,000 | .038500 | .005167 | ..... | ..... | |
| 128,100 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 128,100 |
| Elastic limit per square inch of original section | do... | 68,000 |
| Elongation per inch after rupture | inch.. | .1733 |
| Elongation per inch under strain at elastic limit | do... | .002900 |
| Reduction in diameter at point of rupture | do... | .125 |
| Reduction in area after rupture, per cent of original section | | 43.3 |
| Position of rupture | | ″.45 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ″.25*, ″.12, ″.15 |

## TABULATION OF TENSION SPECIMENS FROM RIFLE BARRELS THAT WERE DIFFICULT TO DRILL.

| No. of test. | Marks. | Diameter. | Sectional. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation in 3 inches. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Per cent.* | *Per cent.* | | ″ ″ ″ | |
| 6554 | (1) S | .588 .300 | .20 | 47,000 | 112,050 | 12.0 | ..... | Fine granular | .14*, .13, .09 | Breech specimen. |
| 6555 | (1) S | .505 | .20 | 62,000 | 121,400 | 18.0 | 46.2 | Fine silky | .11, .31*, .12 | Muzzle specimen. |
| 6556 | (2) S | .588 .300 | .20 | 58,000 | 128,350 | 9.0 | ..... | Fine granular | .14*, .08, .05 | Breech specimen. |
| 6557 | (2) S | .500 | .20 | 61,000 | 128,600 | 12.3 | 23.9 | Granular, radiating from silky spot in circumference. | .08, .10, .19* | Muzzle specimen. |
| 6558 | (3) S | .588 .300 | .20 | 55,000 | 125,600 | 9.3 | ..... | Fine granular | .05, .07, .16* | Breech specimen. |
| 6559 | (3) S | .505 | .20 | 63,000 | 126,950 | 16.7 | 30.7 | Silky, interspersed with fine granulation. | .08, .10, .22 | Muzzle specimen. |
| 6560 | (4) S | .588 .300 | .20 | 55,000 | 121,100 | 12.3 | ..... | Fine granular | .08, .20*, .09 | Breech specimen. |
| 6561 | (5) S | .588 .300 | .20 | 55,000 | 118,200 | 14.7 | ..... | Silky, interspersed with fine granulation. | .20, .15*, .09 | Specimen 9¼″ from breech. |
| 6562 | (6) S | .588 .300 | .20 | 60,000 | 135,750 | 11.3 | ..... | Fine granular | .07, .14*, .13 | Specimen 12″ from breech. |
| 6563 | (7) S | .588 .300 | .20 | 59,000 | 128,900 | 11.7 | ..... | .....do | .16*, .12, .07 | Specimen 13¼″ from breech. |
| 6564 | (8) G | .588 .300 | .20 | 62,000 | 129,000 | 15.0 | ..... | Silky, interspersed with fine granulation. | .13, .24*, .08 | Breech specimen. |
| 6565 | (8) G | .580 .300 | .1936 | 65,000 | 129,100 | 12.7 | ..... | Silky and fine granular, metal interspersed. | .19*, .13, .06 | Specimen 17.2″ from breech. |
| 6566 | (9) S | .588 .300 | .20 | 48,000 | 112,600 | 14.0 | ..... | Fine granular | .09, .21*, .12 | Breech specimen. |
| 6567 | (9) S | .588 .300 | .20 | 51,000 | 122,600 | 11.0 | ..... | .....do | .18*, .09, .06 | Specimen 23¼″ from breech. |
| 6568 | (10) S | .588 .300 | .20 | 50,000 | 121,500 | 12.0 | ..... | .....do | .10, .17*, .09 | Breech specimen. |
| 6569 | (10) S | .588 .300 | .20 | 58,000 | 128,900 | 14.7 | ..... | .....do | .06, .09, .19* | Specimen 27″ from breech. |
| 6583 | (5) S | .588 .300 | .20 | 55,000 | 113,000 | 15.7 | ..... | Silky, interspersed with fine granulation. | .08, .21*, .18 | Breech specimen, annealed at low heat in lime. |
| 6584 | (6) S | .588 .300 | .20 | 63,000 | 131,900 | 14.3 | ..... | Fine granular | .10, .11, .22* | Breech specimen, annealed at heat above specimen (5) S in lime. |
| 6585 | (7) S | .588 .300 | .20 | 60,000 | 126,100 | 12.8 | ..... | Silky, interspersed with fine granulation. | .06, .07, .24* | Breech specimen, annealed at heat above specimen (6) S in lime. |
| 6586 | (1) S | .505 | .20 | 61,000 | 125,100 | 14.8 | 40.3 | Fine silky, trace of granulation | .06, .09, .28* | Specimen near muzzle end, annealed in lime. |
| 6587 | (2) S | .505 | .20 | 64,000 | 132,550 | 14.0 | 34.0 | Silky, interspersed with fine granulation. | .23*, .10, .09 | Do. |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6588 | (3) S | .505 | .20 | 66,000 | 127,000 | 15.0 | 43.8 | Silky, trace of granulation | .09, | .09, | .27* | Do. |
| 6601 | (1) S | .505 | .20 | 68,000 | 122,050 | 17.3 | 51.9 | Fine silky, cup shaped | .10, | .30*, | .12 | Piece of barrel heated low red and swaged down to ¾ diameter, reheated and annealed in charcoal. |
| 6602 | (2) S | .505 | .20 | 69,000 | 121,850 | 17.7 | 49.1 | .....do | .09, | .18, | .31* | Do. |
| 6603 | (3) S | .505 | .20 | 72,000 | 119,600 | 17.7 | 51.9 | Fine silky, serrated | .08, | .12, | .33* | Do. |
| 6604 | (6) S | .505 | .20 | 64,000 | 123,000 | 14.3 | 43.3 | Fine silky, cup shaped | | | | Section of barrel annealed in charcoal. |
| 6605 | (6) S | .505 | .20 | [1]58,000 | 127,040 | 16.0 | 29.3 | Granular, radiating from a silky spot in the circumference. | .10, | .21*, | .17 | Section of barrel annealed in charcoal at higher temperature than 6604. |
| 6606 | (8) G | .505 | .20 | 70,000 | 121,500 | 17.3 | 49.1 | Fine silky, cup shaped | .09, | .13, | .30* | Section of barrel annealed in charcoal. |
| 6624 | (4) S | .505 | .20 | 81,000 | 114,450 | 19.0 | 59.8 | Fine silky, serrated | .10, | .11, | .36* | Oil tempered and annealed. |
| 6625 | (5) S | .505 | .20 | 107,000 | 127,600 | 14.3 | 54.6 | .....do | .31*, | .06, | .06 | Do. |
| 6626 | (7) S | .505 | .20 | 118,000 | 143,500 | 12.0 | 40.3 | Fine silky, irregular surface, serrated. | .05, | .06, | .25* | Do. |
| 6630 | (7) S | .505 | .20 | 130,000 | 147,050 | 11.3 | 34.0 | Fine silky, cup shaped, serrated | .05, | .17, | .12* | Oil tempered and annealed at low heat. |
| 6639 | (5) S | .505 | .20 | 66,000 | 119,700 | 19.0 | 51.9 | Fine silky, cup shaped | .32*, | .12, | .13 | Oil tempered at low heat and annealed at high heat. |
| 6640 | (5) S | .505 | .20 | 74,000 | 108,500 | 21.7 | 62.2 | Fine silky | .38*, | .15, | .12 | Oil tempered at low heat, annealed at bright cherry color. |
| 6723 | (4) S | .505 | .20 | 70,000 | 129,800 | 17.3 | 46.2 | .....do | .16, | .26*, | .10 | Heated a low red and cooled in oil. |
| 6724 | (4) S | .505 | .20 | 68,000 | 128,100 | 17.3 | 43.3 | .....do | .25*, | .12, | .15 | Heated bright red and cooled in air blast. |

[1] Approximate.

NOTE.—Where two diameters are given, the specimens were hollow.

# ROLLED BARRELS

AND

# ROLLED AND ANNEALED BARRELS.

## EXPLANATION FROM SPRINGFIELD ARMORY OF MARKS USED ON BARS.

"The letters R B E indicate rolled breech end; R M E—rolled muzzle end; R A B E—rolled annealed breech end; R A M E—rolled annealed muzzle end, and the numbers following denote the temperature expressed in degrees C. at which rolled and annealed."

No. 6653.

Rolled barrel.
Marks, R B E–940.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000600 | .000300 | ..... | ..... | |
| 30,000 | .000933 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000400 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 64,000 | .002167 | .000167 | ..... | ..... | |
| 65,000 | .002200 | .000033 | ..... | ..... | Elastic limit. |
| 66,000 | .003667 | .001467 | ..... | ..... | |
| 67,000 | .004333 | .000666 | ..... | ..... | |
| 68,000 | .005500 | .001167 | ..... | ..... | |
| 70,000 | .007000 | .001500 | ..... | ..... | |
| 72,000 | .008333 | .001333 | ..... | ..... | |
| 76,000 | .011333 | .003000 | ..... | ..... | |
| 80,000 | .014000 | .002667 | ..... | ..... | |
| 84,000 | .017167 | .003167 | ..... | ..... | |
| 86,000 | .020167 | .003000 | ..... | ..... | |
| 92,000 | .023667 | .003500 | ..... | ..... | |
| 96,000 | .028000 | .004333 | ..... | ..... | |
| 100,000 | .032000 | .004000 | ..... | ..... | |
| 104,000 | .037333 | .005333 | ..... | ..... | |
| 105,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 105,050 |
| Elastic limit per square inch of original section | do... | 65,000 |
| Elongation per inch after rupture | inch.. | .1600 |
| Elongation per inch under strain at elastic limit | do... | .002200 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | 1″.08 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ″.08, ″.15, ″.25* |

## No. 6654.

Rolled barrel.
Marks, R B E–810.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000267 | .000200 | ..... | ..... | |
| 20,000 | .000600 | .000333 | ..... | ..... | |
| 30,000 | .000933 | .000333 | ..... | ..... | |
| 40,000 | .001300 | .000367 | ..... | ..... | |
| 50,000 | .001633 | .000333 | 0. | ..... | |
| 60,000 | .002000 | .000367 | ..... | ..... | |
| 66,000 | .002283 | .000233 | ..... | ..... | |
| 67,000 | .002267 | .000034 | ..... | ..... | |
| 68,000 | .002300 | .000033 | ..... | ..... | Elastic limit. |
| 69,000 | .009333 | .007033 | ..... | ..... | |
| 70,000 | .010333 | .001000 | ..... | ..... | |
| 71,000 | .011000 | .000667 | ..... | ..... | |
| 72,000 | .011500 | .000500 | ..... | ..... | |
| 76,000 | .013667 | .002167 | ..... | ..... | |
| 80,000 | .017333 | .003666 | ..... | ..... | |
| 84,000 | .021333 | .004000 | ..... | ..... | |
| 88,000 | .024667 | .003334 | ..... | ..... | |
| 92,000 | .028667 | .004000 | ..... | ..... | |
| 96,000 | .033333 | .004666 | ..... | ..... | |
| 100,000 | .038667 | .005334 | ..... | ..... | |
| 104,000 | .045500 | .006833 | ..... | ..... | |
| 116,000 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 116,000 |
| Elastic limit per square inch of original section | do... | 68,000 |
| Elongation per inch after rupture | inch.. | .1833 |
| Elongation per inch under strain at elastic limit | do... | .002900 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1".2 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ".19*, ".27*, ".09 |

No. 6655.

**Rolled barrel.**
**Marks, R B E–740.**
**Diameter, ".505.**
**Sectional area, .20 square inch.**
**Gauged length, 8".**

| Applied loads per square inch. | Elongation per inch | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| | | | 0. | 0. | Initial load. |
| | | | | | Elastic limit. |
| | | | | | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 112,000 |
| of original section | do... | 78,000 |
| ture | inch.. | .2167 |
| rain at elastic limit | do... | .002688 |
| nt of rupture | do... | .165 |
| re, per cent of original section | | 54.6 |
| | | 1" 4 from neck |
| | | fine silky, cup shaped |
| | | ".12, ".36*, ".17 |

## No. 6656.

Rolled barrel.
Marks, R B E–730.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | ..... | ..... | |
| 60,000 | .002033 | .000366 | ..... | ..... | |
| 70,000 | .002367 | .000334 | ..... | ..... | |
| 75,000 | .002567 | .000200 | ..... | ..... | Elastic limit. |
| | .016333 | .013766 | ..... | ..... | |
| 76,000 | 017833 | .001000 | ..... | ..... | |
| 78,000 | .018833 | .001500 | ..... | ..... | |
| 80,000 | .020667 | .001834 | ..... | ..... | |
| 84,000 | .024500 | .003833 | ..... | ..... | |
| 88,000 | .028667 | .004167 | ..... | ..... | |
| 92,000 | .033000 | .004333 | ..... | ..... | |
| 96,000 | .039667 | .006667 | ..... | ..... | |
| 100,000 | .047333 | .007666 | ..... | ..... | |
| 113,900 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 113,900 |
| Elastic limit per square inch of original section | do... | 75,000 |
| Elongation per inch after rupture | inch.. | .2067 |
| Elongation per inch under strain at elastic limit | do... | .002567 |
| Reduction in diameter at point of rupture | do... | 165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | 1″.6 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | #.13, #.38*, #.11 |

## No. 6657.

Rolled barrel.
Marks, R B E–650.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000367 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002033 | .000866 | ..... | ..... | |
| 70,000 | .002867 | .000834 | ..... | ..... | |
| 75,000 | .002567 | .000200 | ..... | ..... | |
| 77,000 | .002667 | .000100 | ..... | ..... | |
| 78,000 | .002700 | .000033 | ..... | ..... | Elastic limit. |
| 79,000 | .016333 | .013633 | ..... | ..... | |
| 80,000 | .018167 | .001834 | ..... | ..... | |
| 84,000 | .026000 | .007833 | ..... | ..... | |
| 88,000 | .030667 | .004667 | ..... | ..... | |
| 92,000 | .035667 | .005000 | ..... | ..... | |
| 96,000 | .042333 | .006666 | ..... | ..... | |
| 100,000 | .050000 | .007667 | ..... | ..... | |
| 112,000 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 112,000 |
| Elastic limit per square inch of original section | do... | 78,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do... | .002700 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.37*, ″.13, ″.10 |

## No. 6655.

**Rolled barrel.**
**Marks. R B E–600.**
**Diameter, ".505.**
**Sectional area, .20 square inch.**
**Gauged length, 3".**

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | | |
| 10,000 | .000300 | .000233 | | | |
| 20,000 | .000533 | .000333 | | | |
| 30,000 | .000967 | .000334 | | | |
| 40,000 | .001300 | .000333 | | | |
| 50,000 | .001667 | .000367 | 0. | | |
| 60,000 | .002000 | .000333 | | | |
| 70,000 | .002367 | .000367 | | | |
| 80,000 | .002700 | .000333 | | | |
| 84,000 | .002867 | .000167 | | | Elastic limit. |
| 85,000 | .004833 | .001966 | | | |
| 86,000 | .006333 | .001500 | | | |
| 88,000 | .011000 | .004667 | | | |
| 90,000 | .013000 | .002000 | | | |
| 94,000 | .016667 | .003667 | | | |
| 98,000 | .022333 | .005666 | | | |
| 102,000 | .026667 | .004334 | | | |
| 106,000 | .031667 | .005000 | | | |
| 110,000 | .038333 | .006666 | | | |
| 119,050 | | | | | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 119,050 |
| Elastic limit per square inch of original section | do... | 84,000 |
| Elongation per inch after rupture | inch.. | .1367 |
| Elongation per inch under strain at elastic limit | do... | .002867 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | do... | 49.1 |
| Position of rupture | | ".55 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".05, ".08, ".28* |

## No. 6659.

Rolled barrel.
Marks, R B E–580.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000800 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000833 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 80,000 | .002700 | .000367 | ..... | ..... | |
| 82,000 | .002733 | .000033 | ..... | ..... | |
| 83,000 | .002800 | .000067 | ..... | ..... | Elastic limit. |
| | .006500 | .003700 | ..... | ..... | |
| 84,000 | .008000 | .001500 | ..... | ..... | |
| 88,000 | .013167 | .005167 | ..... | ..... | |
| 92,000 | .017000 | .003833 | ..... | ..... | |
| 96,000 | .020667 | .003667 | ..... | ..... | |
| 100,000 | .025333 | .004666 | ..... | ..... | |
| 104,000 | .030333 | .005000 | ..... | ..... | |
| 108,000 | .037667 | .007334 | ..... | ..... | |
| 112,000 | .047000 | .009333 | ..... | ..... | |
| 117,900 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 117,900 |
| Elastic limit per square inch of original section | do... | 83,000 |
| Elongation per inch after rupture | inch.. | .1367 |
| Elongation per inch under strain at elastic limit | do... | .002800 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | ″.5 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.06, ″.07, ″.29* |

## No. 6660.

Rolled barrel.
Marks, R B E–540.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000267 | .000200 | ..... | ..... | |
| 20,000 | .000600 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000367 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002367 | .000367 | ..... | ..... | |
| 80,000 | .002700 | .000333 | ..... | ..... | |
| 88,000 | .002967 | .000267 | ..... | ..... | |
| 89,000 | .003000 | .000033 | ..... | ..... | Elastic limit. |
| 90,000 | .007167 | .004167 | ..... | ..... | |
| 92,000 | .009667 | .002500 | ..... | ..... | |
| 96,000 | .015333 | .005666 | ..... | ..... | |
| 100,000 | .020000 | .004667 | ..... | ..... | |
| 104,000 | .023333 | .003333 | ..... | ..... | |
| 108,000 | .029333 | .006000 | ..... | ..... | |
| 112,000 | .036000 | .006667 | ..... | ..... | |
| 120,100 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 120,100 |
| Elastic limit per square inch of original section | do... | 89,000 |
| Elongation per inch after rupture | inch.. | .1267 |
| Elongation per inch under strain at elastic limit | do... | .003000 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | ″.50 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.29*, ″.05, ″.04 |

## No. 6661.

Rolled barrel.
Marks, $R_2$ B E–540.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | ..... | ..... | |
| 60,000 | .002000 | .000333 | 0. | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 80,000 | .002667 | .000334 | ..... | ..... | |
| 87,000 | .002933 | .000266 | ..... | ..... | |
| 88,000 | .003000 | .000067 | ..... | ..... | Elastic limit. |
| 89,000 | .006500 | .003500 | ..... | ..... | |
| 90,000 | .008000 | .001500 | ..... | ..... | |
| 94,000 | .013333 | .005333 | ..... | ..... | |
| 96,000 | .015500 | .002167 | ..... | ..... | |
| 100,000 | .020400 | .004900 | ..... | ..... | |
| 104,000 | .024000 | .003600 | ..... | ..... | |
| 108,000 | .029667 | .005667 | ..... | ..... | |
| 112,000 | .036667 | .007000 | ..... | ..... | |
| 120,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 120,500 |
| Elastic limit per square inch of original section | do... | 88,000 |
| Elongation per inch after rupture | inch.. | .1267 |
| Elongation per inch under strain at elastic limit | do... | .003000 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | ..... | 49.1 |
| Position of rupture | | ″.6 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.04, ″.07, ″.27* |

## No. 6662.

Rolled barrel.
Marks, $R_3$ B E–540.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001633 | .000333 | 0. | ..... | |
| 60,000 | .001967 | .000334 | ..... | ..... | |
| 70,000 | .002333 | .000366 | ..... | ..... | |
| 80,000 | .002667 | .000334 | ..... | ..... | |
| 85,000 | .002833 | .000166 | ..... | ..... | |
| 86,000 | .002867 | .000034 | ..... | ..... | Elastic limit. |
| 87,000 | .008000 | .005133 | ..... | ..... | |
| 88,000 | .009000 | .001000 | ..... | ..... | |
| 90,000 | .012333 | .003333 | ..... | ..... | |
| 92,000 | .014333 | .002000 | ..... | ..... | |
| 96,000 | .019167 | .004834 | ..... | ..... | |
| 100,000 | .023500 | .004333 | ..... | ..... | |
| 104,000 | .027667 | .004167 | ..... | ..... | |
| 108,000 | .033667 | .006000 | ..... | ..... | |
| 112,000 | .043000 | .009333 | ..... | ..... | |
| 119,800 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 119,800 |
| Elastic limit per square inch of original section | do... | 86,000 |
| Elongation per inch after rupture | inch.. | .1333 |
| Elongation per inch under strain at elastic limit | do... | .002867 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | ″.55 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.29*, ″.06, ″.05 |

## No. 6663.

Rolled barrel.
Marks, R B E–510.
Diameter, ″.505.
Sectional area, .20 square inch
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 72,000 | .002400 | .000067 | ..... | ..... | |
| 73,000 | .002433 | .000033 | ..... | ..... | Elastic limit. |
| 74,000 | .004000 | .001567 | ..... | ..... | |
| 75,000 | .005333 | .001333 | ..... | ..... | |
| 76,000 | .006500 | .001167 | ..... | ..... | |
| 78,000 | .009667 | .003167 | ..... | ..... | |
| 80,000 | .011333 | .001666 | ..... | ..... | |
| 84,000 | .015000 | .003667 | ..... | ..... | |
| 88,000 | .018333 | .003333 | ..... | ..... | |
| 92,000 | .022000 | .003667 | ..... | ..... | |
| 96,000 | .026333 | .004333 | ..... | ..... | |
| 100,000 | .034667 | .008334 | ..... | ..... | |
| 104,000 | .036667 | .002000 | ..... | ..... | |
| 108,000 | .045000 | .008333 | ..... | ..... | |
| 117,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 117,000 |
| Elastic limit per square inch of original section | do... | 73,000 |
| Elongation per inch after rupture | inch.. | .1733 |
| Elongation per inch under strain at elastic limit | do.. | .002433 |
| Reduction in diameter at point of rupture | do.. | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.09, ″.11, ″.32* |

## No. 6664.

Rolled barrel.
Marks, R B E–500.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 80,000 | .002700 | .000367 | ..... | ..... | |
| 90,000 | .003033 | .000333 | ..... | ..... | |
| 97,000 | .003300 | .000267 | ..... | ..... | |
| 98,000 | .003333 | .000033 | ..... | ..... | Elastic limit. |
| 99,000 | .004667 | .001334 | ..... | ..... | |
| 100,000 | .005333 | .000666 | ..... | ..... | |
| 104,000 | .008333 | .003000 | ..... | ..... | |
| 108,000 | .013000 | .004667 | ..... | ..... | |
| 112,000 | .017333 | .004333 | ..... | ..... | |
| 116,000 | .022333 | .005000 | ..... | ..... | |
| 120,000 | .027667 | .005334 | ..... | ..... | |
| 127,600 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 127,600 |
| Elastic limit per square inch of original section | do... | 98,000 |
| Elongation per inch after rupture | inch.. | .1000 |
| Elongation per inch under strain at elastic limit | do... | .003333 |
| Reduction in diameter at point of rupture | do... | .125 |
| Reduction in area after rupture, per cent of original section | | 43.3 |
| Position of rupture | | ″.35 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.08, ″.08, ″.24* |

## No. 6665.

Rolled barrel.
Marks, R M E–940.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002033 | .000366 | ..... | ..... | |
| 70,000 | .002367 | .000334 | ..... | ..... | |
| 77,000 | .002567 | .000200 | ..... | ..... | |
| 78,000 | .002600 | .000033 | ..... | ..... | Elastic limit. |
| 79,000 | .014333 | .011733 | ..... | ..... | |
| 80,000 | .015333 | .001000 | ..... | ..... | |
| 84,000 | .018000 | .002667 | ..... | ..... | |
| 88,000 | .021333 | .003333 | ..... | ..... | |
| 92,000 | .025000 | .003667 | ..... | ..... | |
| 96,000 | .029500 | .004500 | ..... | ..... | |
| 100,000 | .033667 | .004167 | ..... | ..... | |
| 104,000 | .040000 | .006333 | ..... | ..... | |
| 119,550 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 119,550 |
| Elastic limit per square inch of original section | do... | 78,000 |
| Elongation per inch after rupture | inch.. | .1767 |
| Elongation per inch under strain at elastic limit | do... | .002600 |
| Reduction in diameter at point of rupture | do .. | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | ".95 from neck |
| Character of broken surface. | | fine silky, cup shaped |
| Elongation of inch sections | | ".08, ".13, ".32* |

No. 6666.

Rolled barrel.
Marks, R M E–810.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 117,100 |
| Elastic limit per square inch of original section | do.... | 78,000 |
| Elongation per inch after rupture | inch.. | .1988 |
| Elongation per inch under strain at elastic limit | do.... | .002800 |
| Reduction in diameter at point of rupture | do.... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".11, ".35*, ".12 |

## No. 6667.

Rolled barrel.
Marks, R M E–740.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 80,000 | .002667 | .000334 | ..... | ..... | |
| 90,000 | .003033 | .000366 | ..... | ..... | Elastic limit. |
| 91,000 | .026000 | .022967 | ..... | ..... | |
| 92,000 | .027333 | .001333 | ..... | ..... | |
| 96,000 | .031667 | .004334 | ..... | ..... | |
| 100,000 | .037667 | .006000 | ..... | ..... | |
| 104,000 | .044000 | .006333 | ..... | ..... | |
| 108,000 | .053333 | .009333 | ..... | ..... | |
| 117,400 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 117,400 |
| Elastic limit per square inch of original section | do... | 90,000 |
| Elongation per inch after rupture | inch.. | .2100 |
| Elongation per inch under strain at elastic limit | do... | .003033 |
| Reduction in diameter at point of rupture | do... | .175 |
| Reduction in area after rupture, per cent of original section | | 57.2 |
| Position of rupture | | 1″.7 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.13, ″.38*, ″.12 |

## No. 6668.

Rolled barrel.
Marks, R M E–730.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 80,000 | .002667 | .000334 | ..... | ..... | |
| 81,000 | .002700 | .000033 | ..... | ..... | |
| 82,000 | .002733 | .000033 | ..... | ..... | |
| 83,000 | .002767 | .000034 | ..... | ..... | Elastic limit. |
| | .019367 | .016600 | ..... | ..... | |
| 84,000 | .020000 | .000633 | ..... | ..... | |
| 88,000 | .024333 | .004333 | ..... | ..... | |
| 92,000 | .028667 | .004334 | ..... | ..... | |
| 96,000 | .033333 | .004666 | ..... | ..... | |
| 100,000 | .040000 | .006667 | ..... | ..... | |
| 116,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 116,500 |
| Elastic limit per square inch of original section | do... | 83,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do... | .002767 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | 1″.24 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.24*, ″.25*, ″.11 |

## No. 6669.

Rolled barrel.
Marks, R M E–650.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 80,000 | .002667 | .000334 | ..... | ..... | |
| 90,000 | .003033 | .000366 | ..... | ..... | |
| 95,000 | .003167 | .000134 | ..... | ..... | |
| 96,000 | .003200 | .000033 | ..... | ..... | Elastic limit. |
| 97,000 | .036333 | .033133 | ..... | ..... | |
| 98,000 | .037667 | .001334 | ..... | ..... | |
| 100,000 | .040333 | .002666 | ..... | ..... | |
| 104,000 | .047667 | .007334 | ..... | ..... | |
| 117,100 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 117,100 |
| Elastic limit per square inch of original section | do... | 96,000 |
| Elongation per inch after rupture | inch.. | .2233 |
| Elongation per inch under strain at elastic limit | do... | .003200 |
| Reduction in diameter at point of rupture | do... | .175 |
| Reduction in area after rupture, per cent of original section | | 57.2 |
| Position of rupture | | 1″.4 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.12, ″.39*, ″.16 |

## No. 6670.

Rolled barrel.
Marks, R M E–600.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 80,000 | .002700 | .000367 | ..... | ..... | |
| 87,000 | .002933 | .000233 | ..... | ..... | |
| 88,000 | .002967 | .000034 | ..... | ..... | Elastic limit. |
| 89,000 | .003333 | .000366 | ..... | ..... | |
| 90,000 | .003967 | .000634 | ..... | ..... | |
| 92,000 | .008333 | .004366 | ..... | ..... | |
| 96,000 | .014667 | .006334 | ..... | ..... | |
| 100,000 | .019000 | .004333 | ..... | ..... | |
| 104,000 | .023667 | .004667 | ..... | ..... | |
| 106,000 | .028667 | .005000 | ..... | ..... | |
| 112,000 | .035000 | .006333 | ..... | ..... | |
| 124,650 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 124,650 |
| Elastic limit per square inch of original section | do... | 88,000 |
| Elongation per inch after rupture | inch.. | .1500 |
| Elongation per inch under strain at elastic limit | do... | .002967 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | fine silky, serrated |
| Elongation of inch sections | | ″.07, ″.09, ″.29* |

## No. 6671.

Rolled barrel.
Marks, R M E–580.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 80,000 | .002700 | .000367 | ..... | ..... | |
| 89,000 | .002967 | .000267 | ..... | ..... | |
| 90,000 | .003000 | .000033 | ..... | ..... | |
| 91,000 | .003067 | .000067 | ..... | ..... | Elastic limit. |
| 92,000 | .003200 | .000133 | ..... | ..... | |
| | .011333 | .008133 | ..... | ..... | |
| 93,000 | .012333 | .001000 | ..... | ..... | |
| 94,000 | .013167 | .000834 | ..... | ..... | |
| 96,000 | .015000 | .001833 | ..... | ..... | |
| 100,000 | .020667 | .005667 | ..... | ..... | |
| 104,000 | .025167 | .004500 | ..... | ..... | |
| 108,000 | .030000 | .004833 | ..... | ..... | |
| 112,000 | .038167 | .008167 | ..... | ..... | |
| 116,000 | .047000 | .008833 | ..... | ..... | |
| 123,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 123,500 |
| Elastic limit per square inch of original section | do... | 91,000 |
| Elongation per inch after rupture | inch.. | .1667 |
| Elongation per inch under strain at elastic limit | do... | .003067 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | fine silky, serrated |
| Elongation of inch sections | | ″.31*, ″.11, ″.08 |

## No. 6672.

Rolled barrel.
Marks, R M E–540.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 80,000 | .002667 | .000334 | ..... | ..... | |
| 90,000 | .003000 | .000333 | ..... | ..... | |
| 92,000 | .003067 | .000067 | ..... | ..... | Elastic limit. |
| 93,000 | .003200 | .000133 | ..... | ..... | |
| 94,000 | .003333 | .000133 | ..... | ..... | |
| 95,000 | .004000 | .000667 | ..... | ..... | |
| 96,000 | .005500 | .001500 | ..... | ..... | |
| 98,000 | .009667 | .004167 | ..... | ..... | |
| 100,000 | .012000 | .002333 | ..... | ..... | |
| 104,000 | .016667 | .004667 | ..... | ..... | |
| 108,000 | .021667 | .005000 | ..... | ..... | |
| 112,000 | .025667 | .004000 | ..... | ..... | |
| 116,000 | .031000 | .005333 | ..... | ..... | |
| 130,500 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 130,500 |
| Elastic limit per square inch of original section | do... | 92,000 |
| Elongation per inch after rupture | inch.. | .1633 |
| Elongation per inch under strain at elastic limit | do... | .003067 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | 1″.60 from neck |
| Character of broken surface | | fine silky, serrated |
| Elongation of inch sections | | ″.10, ″.30*, ″.09 |

## No. 6673.

Rolled barrel.
Marks, R, M E–540.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001700 | .000367 | 0. | ..... | |
| 60,000 | .002033 | .000333 | ..... | ..... | |
| 70,000 | .002367 | .000334 | ..... | ..... | |
| 80,000 | .002700 | .000333 | ..... | ..... | |
| 90,000 | .003067 | .000367 | ..... | ..... | |
| 92,000 | .003133 | .000066 | ..... | ..... | |
| 93,000 | .003267 | .000134 | ..... | ..... | |
| 94,000 | .003333 | .000066 | ..... | ..... | |
| 95,000 | .003400 | .000067 | .000067 | .000067 | Elastic limit. |
| 96,000 | .003600 | .000200 | ..... | ..... | |
| 97,000 | .004167 | .000567 | ..... | ..... | |
| 98,000 | .005000 | .000833 | ..... | ..... | |
| 100,000 | .008667 | .003667 | ..... | ..... | |
| 104,000 | .013333 | .004666 | ..... | ..... | |
| 108,000 | .017333 | .004000 | ..... | ..... | |
| 112,000 | .021333 | .004000 | ..... | ..... | |
| 116,000 | .026333 | .005000 | ..... | ..... | |
| 120,000 | .032167 | .005834 | ..... | ..... | |
| 132,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 132,400 |
| Elastic limit per square inch of original section | do... | 95,000 |
| Elongation per inch after rupture | inch.. | .1500 |
| Elongation per inch under strain at elastic limit | do... | .003400 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | 1".4 from neck |
| Character of broken surface | | fine silky, serrated |
| Elongation of inch sections | | ".09, ".26*, ".10 |

## No. 6674.

Rolled barrel.
Marks, $R_3$ M E–540.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002367 | .000367 | ..... | ..... | |
| 80,000 | .002733 | .000366 | ..... | ..... | |
| 90,000 | .003100 | .000367 | ..... | ..... | |
| 92,000 | .003200 | .000100 | ..... | ..... | Elastic limit. |
| 93,000 | .003667 | .000467 | ..... | ..... | |
| 94,000 | .007667 | .004000 | ..... | ..... | |
| 96,000 | .011167 | .003500 | ..... | ..... | |
| 100,000 | .015667 | .004500 | ..... | ..... | |
| 104,000 | .020500 | .004833 | ..... | ..... | |
| 108,000 | .025000 | .004500 | ..... | ..... | |
| 112,000 | .030833 | .005833 | ..... | ..... | |
| 116,000 | .036000 | .005167 | ..... | ..... | |
| 127,050 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 127,050 |
| Elastic limit per square inch of original section | do... | 92,000 |
| Elongation per inch after rupture | inch.. | .1500 |
| Elongation per inch under strain at elastic limit | do... | .003200 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | ″.8 from neck |
| Character of broken surface | | fine silky, serrated |
| Elongation of inch sections | | ″.07, ″.09, ″.29* |

## No. 6675.

Rolled barrel.
Marks, R M E–510.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | ..... | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001633 | .000333 | .0 | ..... | |
| 60,000 | .001967 | .000334 | ..... | ..... | |
| 70,000 | .002300 | .000333 | ..... | ..... | |
| 80,000 | .002667 | .000367 | ..... | ..... | |
| 86,000 | .002867 | .000200 | ..... | ..... | Elastic limit. |
| 87,000 | .013333 | .010466 | ..... | ..... | |
| 88,000 | .014167 | .000834 | ..... | ..... | |
| 92,000 | .019667 | .005500 | ..... | ..... | |
| 96,000 | .022333 | .002666 | ..... | ..... | |
| 100,000 | .028333 | .006000 | ..... | ..... | |
| 104,000 | .034333 | .006000 | ..... | ..... | |
| 108,000 | .041000 | .006667 | ..... | ..... | |
| 112,000 | .051333 | .010333 | ..... | ..... | |
| 118,500 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 118,500 |
| Elastic limit per square inch of original section | do... | 86,000 |
| Elongation per inch after rupture | inch.. | .2033 |
| Elongation per inch under strain at elastic limit | do... | .002867 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1″.3 from neck |
| Character of broken surface | | fine silky, serrated |
| Elongation of inch sections | | ″.12, ″.32*, ″.17 |

## No. 6676.

Rolled barrel.
Marks, R M E–500.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 80,000 | .002700 | .000367 | ..... | ..... | |
| 90,000 | .003033 | .000333 | ..... | ..... | |
| 93,000 | .003100 | .000067 | ..... | ..... | Elastic limit. |
| 94,000 | .003300 | .000200 | ..... | ..... | |
| 95,000 | .003433 | .000133 | ..... | ..... | |
| 96,000 | .003800 | .000367 | ..... | ..... | |
| 97,000 | .004000 | .000200 | ..... | ..... | |
| 98,000 | .004667 | .000667 | ..... | ..... | |
| 100,000 | .006667 | .002000 | ..... | ..... | |
| 104,000 | .011000 | .004333 | ..... | ..... | |
| 106,000 | .014333 | .003333 | ..... | ..... | |
| 112,000 | .017667 | .003334 | ..... | ..... | |
| 116,000 | .021833 | .003666 | ..... | ..... | |
| 120,000 | .025667 | .004334 | ..... | ..... | |
| 138,450 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 138,450 |
| Elastic limit per square inch of original section | do... | 93,000 |
| Elongation per inch after rupture | inch.. | .1333 |
| Elongation per inch under strain at elastic limit | do... | .003100 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | ″.8 from neck |
| Character of broken surface | | fine silky, serrated |
| Elongation of inch sections | | ″.26* ″09 ″05 |

## No. 6677.

Rolled and annealed barrel.
Marks, R A B E–670.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000333 | .000266 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001700 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000300 | ..... | ..... | |
| 66,000 | .002267 | .000267 | ..... | ..... | |
| 67,000 | .002300 | .000033 | ..... | ..... | Elastic limit. |
| | .012500 | .010200 | ..... | ..... | |
| 68,000 | .013100 | .000600 | ..... | ..... | |
| 70,000 | .014000 | .000900 | ..... | ..... | |
| 72,000 | .015333 | .001333 | ..... | ..... | |
| 76,000 | .018333 | .003000 | ..... | ..... | |
| 80,000 | .021500 | .003167 | ..... | ..... | |
| 84,000 | .024500 | .003000 | ..... | ..... | |
| 88,000 | .028333 | .003833 | ..... | ..... | |
| 92,000 | .032667 | .004334 | ..... | ..... | |
| 96,000 | .037667 | .005000 | ..... | ..... | |
| 100,000 | .043667 | .006000 | ..... | ..... | |
| 114,700 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 114,700 |
| Elastic limit per square inch of original section | do... | 67,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do... | .002300 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1″.6 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.12, ″.86*, ″.12 |

## No. 6678.

Rolled and annealed barrel.
Marks, R A B E–660.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 67,000 | .002267 | .000267 | ..... | ..... | |
| 68,000 | .002333 | .000066 | ..... | ..... | Elastic limit |
| | .016333 | .014000 | ..... | ..... | |
| 70,000 | .017333 | .001000 | ..... | ..... | |
| 72,000 | .019000 | .001667 | ..... | ..... | |
| 76,000 | .022667 | .003667 | ..... | ..... | |
| 80,000 | .027000 | .004333 | ..... | ..... | |
| 84,000 | .031667 | .004667 | ..... | ..... | |
| 88,000 | .037333 | .005666 | ..... | ..... | |
| 92,000 | .043333 | .006000 | ..... | ..... | |
| 96,000 | .052667 | .009334 | ..... | ..... | |
| 100,000 | .065000 | .012333 | ..... | ..... | |
| 107,300 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 107,300 |
| Elastic limit per square inch of original section | do... | 68,000 |
| Elongation per inch after rupture | inch.. | .2067 |
| Elongation per inch under strain at elastic limit | do... | .002333 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | 1″.2 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.28*, ″.22, ″.12 |

## No. 6679.

Rolled and annealed barrel.
Marks, R A B E–610.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 63,000 | .002133 | .000133 | ..... | ..... | |
| 64,000 | .002200 | .000067 | ..... | ..... | Elastic limit. |
| 65,000 | .012667 | .010467 | ..... | ..... | |
| 66,000 | .013333 | .000666 | ..... | ..... | |
| 68,000 | .014333 | .001000 | ..... | ..... | |
| 72,000 | .017167 | .002834 | ..... | ..... | |
| 76,000 | .020333 | .003166 | ..... | ..... | |
| 80,000 | .023667 | .003334 | ..... | ..... | |
| 84,000 | .027500 | .003833 | ..... | ..... | |
| 88,000 | .031667 | .004167 | ..... | ..... | |
| 92,000 | .036667 | .005000 | ..... | ..... | |
| 96,000 | .043333 | .006666 | ..... | ..... | |
| 100,000 | .051333 | .008000 | ..... | ..... | |
| 110,900 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 110,900 |
| Elastic limit per square inch of original section | do... | 64,000 |
| Elongation per inch after rupture | inch.. | .2100 |
| Elongation per inch under strain at elastic limit | do... | .002200 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.18, ″.87*, ″.18 |

## No. 6680.

**Rolled and annealed barrel.**
**Marks R A B E–600.**
**Diameter, ".505.**
**Sectional area, .20 square inch.**
**Gauged length, 3".**

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000033 | .000033 | 0. | ..... | |
| 10,000 | .000267 | .000234 | ..... | ..... | |
| 20,000 | .000600 | .000333 | ..... | ..... | |
| 30,000 | .000933 | .000333 | ..... | ..... | |
| 40,000 | .001267 | .000334 | ..... | ..... | |
| 50,000 | .001600 | .000333 | 0. | ..... | |
| 60,000 | .001933 | .000333 | ..... | ..... | |
| 69,000 | .002300 | .000367 | ..... | ..... | Elastic limit. |
| 70,000 | .017333 | .015033 | ..... | ..... | |
| 72,000 | .018500 | .001167 | ..... | ..... | |
| 76,000 | .021667 | .003167 | ..... | ..... | |
| 80,000 | .025333 | .003666 | ..... | ..... | |
| 84,000 | .029667 | .004334 | ..... | ..... | |
| 88,000 | .034000 | .004333 | ..... | ..... | |
| 92,000 | .039667 | .005667 | ..... | ..... | |
| 96,000 | .044333 | .004666 | ..... | ..... | |
| 100,000 | .058500 | .014167 | ..... | ..... | |
| 109,600 | ..... | ..... | ..... | ..... | Tensile strergth. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 109,600 |
| Elastic limit per square inch of original section | do... | 69,000 |
| Elongation per inch after rupture | inch.. | .2167 |
| Elongation per inch under strain at elastic limit | do... | .002300 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | 1".45 from neck |
| Character of broken surface | | fine, silky, cup shaped |
| Elongation of inch sections | | #.11, #.37*, #.17 |

## No. 6681.

Rolled and annealed barrel.
Marks, R, A B E–600.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000333 | .000266 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001700 | .000367 | 0. | ..... | |
| 60,000 | .002033 | .000333 | ..... | ..... | |
| 67,000 | .002333 | .000300 | ..... | ..... | Elastic limit. |
| | .004700 | .002367 | ..... | ..... | |
| 68,000 | .005700 | .001000 | ..... | ..... | |
| 72,000 | .011200 | .005500 | ..... | ..... | |
| 76,000 | .014700 | .003500 | ..... | ..... | |
| 80,000 | .017867 | .003167 | ..... | ..... | |
| 84,000 | .021333 | .003466 | ..... | ..... | |
| 88,000 | .025867 | .004534 | ..... | ..... | |
| 92,000 | .030667 | .004800 | ..... | ..... | |
| 96,000 | .036667 | .006000 | ..... | ..... | |
| 100,000 | .044333 | .007666 | ..... | ..... | |
| 110,600 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 110,600 |
| Elastic limit per square inch of original section | do... | 67,000 |
| Elongation per inch after rupture | inch.. | .1933 |
| Elongation per inch under strain at elastic limit | do... | .002333 |
| Reduction in diameter at point of rupture | do... | .175 |
| Reduction in area after rupture, per cent of original section | | 57.2 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ″.35*, ″.14, ″.09 |

## No. 6682.

**Rolled and annealed barrel.**
**Marks, R, A B E–600.**
**Diameter, ".505.**
**Sectional area, .20 square inch.**
**Gauged length, 3".**

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 75,000 | .002567 | .000234 | ..... | ..... | Elastic limit. |
| 76,000 | .004067 | .001500 | ..... | ..... | |
| 77,000 | .005000 | .000933 | ..... | ..... | |
| 78,000 | .005767 | .000767 | ..... | ..... | |
| 80,000 | .007333 | .001566 | ..... | ..... | |
| 84,000 | .011500 | .004167 | ..... | ..... | |
| 88,000 | .014500 | .003000 | ..... | ..... | |
| 92,000 | .017333 | .002833 | ..... | ..... | |
| 96,000 | .021667 | .004334 | ..... | ..... | |
| 100,000 | .025333 | .003666 | ..... | ..... | |
| 104,000 | .030000 | .004667 | ..... | ..... | |
| 108,000 | .035667 | .005667 | ..... | ..... | |
| 121,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 121,400 |
| Elastic limit per square inch of original section | do... | 75,000 |
| Elongation per inch after rupture | inch.. | .1467 |
| Elongation per inch under strain at elastic limit | do... | .002567 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | ".65 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".29*, ".09, ".06 |

## No. 6683.

Rolled and annealed barrel.
Marks, R A B E–580
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | Elastic limit. |
| 71,000 | .003333 | .001000 | ..... | ..... | |
| 72,000 | .004000 | .000667 | ..... | ..... | |
| 76,000 | .007667 | .003667 | ..... | ..... | |
| 80,000 | .012333 | .004666 | ..... | ..... | |
| 84,000 | .015500 | .003167 | ..... | ..... | |
| 88,000 | .019333 | .003833 | ..... | ..... | |
| 92,000 | .022833 | .003500 | ..... | ..... | |
| 96,000 | .026667 | .003834 | ..... | ..... | |
| 100,000 | .032333 | .005666 | ..... | ..... | |
| 104,000 | .038333 | .006000 | ..... | ..... | |
| 117,100 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 117,100 |
| Elastic limit per square inch of original section | do... | 70,000 |
| Elongation per inch after rupture | inch.. | .1833 |
| Elongation per inch under strain at elastic limit | do... | .002333 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.10, ″.13, ″.32* |

## No. 6684.

Rolled and annealed barrel.
Marks, R, A B E–580.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002383 | .000383 | ..... | ..... | |
| 71,000 | .002367 | .000034 | ..... | ..... | |
| 72,000 | .002433 | .000066 | ..... | ..... | Elastic limit. |
| 73,000 | .004500 | .002067 | ..... | ..... | |
| 74,000 | .005500 | .001000 | ..... | ..... | |
| 76,000 | .007333 | .000833 | ..... | ..... | |
| 80,000 | .012667 | .005334 | ..... | ..... | |
| 84,000 | .015833 | .003166 | ..... | ..... | |
| 88,000 | .019333 | .003500 | ..... | ..... | |
| 92,000 | .023333 | .004000 | ..... | ..... | |
| 96,000 | .027667 | .004334 | ..... | ..... | |
| 100,000 | .032667 | .005000 | ..... | ..... | |
| 104,000 | .039667 | .007000 | ..... | ..... | |
| 116,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 116,050 |
| Elastic limit per square inch of original section | do... | 72,000 |
| Elongation per inch after rupture | inch.. | .1867 |
| Elongation per inch under strain at elastic limit | do... | .002433 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.11, ″.13, ″.32* |

## No. 6685.

Rolled and annealed barrel.
Marks, R. A. B. E.–570.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002367 | .000367 | ..... | ..... | |
| 71,000 | .002400 | .000033 | ..... | ..... | Elastic limit. |
| 72,000 | .005067 | .002667 | ..... | ..... | |
| 74,000 | .006933 | .001866 | ..... | ..... | |
| 76,000 | .009667 | .002734 | ..... | ..... | |
| 80,000 | .013000 | .003333 | ..... | ..... | |
| 84,000 | .016000 | .003000 | ..... | ..... | |
| 88,000 | .019333 | .003333 | ..... | ..... | |
| 92,000 | .023000 | .003667 | ..... | ..... | |
| 96,000 | .027333 | .004333 | ..... | ..... | |
| 100,000 | .032000 | .004667 | ..... | ..... | |
| 104,000 | .038333 | .006333 | ..... | ..... | |
| 108,000 | .046333 | .008000 | ..... | ..... | |
| 117,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 117,550 |
| Elastic limit per square inch of original section | do... | 71,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .002400 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1″.4 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.10, ″.33*, ″.14 |

## No. 6686.

Rolled and annealed barrel.
Marks, $R_2$ A. B. E.–570.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 72,000 | .002400 | .000067 | ..... | ..... | Elastic limit. |
| 73,000 | .004267 | .001867 | ..... | ..... | |
| 74,000 | .005167 | .000900 | ..... | ..... | |
| 76,000 | .007000 | .001833 | ..... | ..... | |
| 80,000 | .012667 | .005667 | ..... | ..... | |
| 84,000 | .016167 | .003500 | ..... | ..... | |
| 88,000 | .020000 | .003833 | ..... | ..... | |
| 92,000 | .024000 | .004000 | ..... | ..... | |
| 96,000 | .028000 | .004000 | ..... | ..... | |
| 100,000 | .035000 | .007000 | ..... | ..... | |
| 104,000 | .040000 | .005000 | ..... | ..... | |
| 116,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 116,000 |
| Elastic limit per square inch of original section | do... | 72,000 |
| Elongation per inch after rupture | inch.. | .1633 |
| Elongation per inch under strain at elastic limit | do... | .002400 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | ".6 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ".31*,".10,".08 |

## No. 6687.

Rolled and annealed barrel.
Marks, R A M E–670.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 80,000 | .002667 | .000334 | ..... | ..... | Elastic limit. |
| | .010500 | .007833 | ..... | ..... | |
| 82,000 | .012000 | .001500 | ..... | ..... | |
| 84,000 | .014667 | .002667 | ..... | ..... | |
| 88,000 | .019000 | .004333 | ..... | ..... | |
| 92,000 | .023667 | .004667 | ..... | ..... | |
| 96,000 | .029333 | .005666 | ..... | ..... | |
| 100,000 | .034833 | .005500 | ..... | ..... | |
| 104,000 | .042500 | .007667 | ..... | ..... | |
| 115,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 115,100 |
| Elastic limit per square inch of original section | do... | 80,000 |
| Elongation per inch after rupture | inch.. | .1933 |
| Elongation per inch under strain at elastic limit | do... | .002667 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | 1″.3 from neck |
| Character of broken surface | | fine silky, serrated |
| Elongation of inch sections | | ″.17, ″.31*, ″.10 |

## No. 6688.

Rolled and annealed barrel.
Marks, R A M E–660.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 68,000 | .002267 | .000267 | ..... | ..... | |
| 69,000 | .002300 | .000033 | ..... | ..... | Elastic limit. |
| 70,000 | .015833 | .013533 | ..... | ..... | |
| 72,000 | .017667 | .001834 | ..... | ..... | |
| 76,000 | .021000 | .003333 | ..... | ..... | |
| 80,000 | .024833 | .003833 | ..... | ..... | |
| 84,000 | .029000 | .004167 | ..... | ..... | |
| 88,000 | .034333 | .005333 | ..... | ..... | |
| 92,000 | .040333 | .006000 | ..... | ..... | |
| 96,000 | .048000 | .007667 | ..... | ..... | |
| 100,000 | .057667 | .009667 | ..... | ..... | |
| 108,800 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 108,800 |
| Elastic limit per square inch of original section | do... | 69,000 |
| Elongation per inch after rupture | inch.. | .2100 |
| Elongation per inch under strain at elastic limit | do... | .002300 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | 1″.50 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.16, ″.34*, ″.13 |

## No. 6689.

Rolled and annealed barrel.
Marks, R A M E–610.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001600 | .000300 | 0. | ..... | |
| 60,000 | .002000 | .000400 | ..... | ..... | |
| 67,000 | .002233 | .000233 | ..... | ..... | |
| 68,000 | .002300 | .000067 | ..... | ..... | Elastic limit. |
| 69,000 | .012667 | .010367 | ..... | ..... | |
| 70,000 | .013400 | .000733 | ..... | ..... | |
| 72,000 | .014333 | .000933 | ..... | ..... | |
| 76,000 | .017000 | .002667 | ..... | ..... | |
| 80,000 | .020000 | .003000 | ..... | ..... | |
| 84,000 | .023000 | .003000 | ..... | ..... | |
| 88,000 | .027000 | .004000 | ..... | ..... | |
| 92,000 | .030667 | .003667 | ..... | ..... | |
| 96,000 | .036333 | .005666 | ..... | ..... | |
| 100,000 | .041333 | .005000 | ..... | ..... | |
| 114,850 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 114,850 |
| Elastic limit per square inch of original section | do... | 68,000 |
| Elongation per inch after rupture | inch.. | .2033 |
| Elongation per inch under strain at elastic limit | do... | .002300 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.14, ″.36*, ″.11 |

## No. 6690.

Rolled and annealed barrel.
Marks, R A M E–600.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000683 | .000383 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002383 | .000333 | ..... | ..... | |
| 71,000 | .002367 | .000084 | ..... | ..... | Elastic limit. |
| 72,000 | .016333 | .013966 | ..... | ..... | |
| 74,000 | .017833 | .001500 | ..... | ..... | |
| 76,000 | .019667 | .001834 | ..... | ..... | |
| 80,000 | .023000 | .003333 | ..... | ..... | |
| 84,000 | .026167 | .003167 | ..... | ..... | |
| 88,000 | .030500 | .004333 | ..... | ..... | |
| 92,000 | .035167 | .004667 | ..... | ..... | |
| 96,000 | .041000 | .005833 | ..... | ..... | |
| 100,000 | .048333 | .007333 | ..... | ..... | |
| 111,700 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 111,700 |
| Elastic limit per square inch of original section | do... | 71,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do... | .002367 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.10, ″.16, ″.34* |

## No. 6691.

Rolled and annealed barrel.
Marks, R, A M E–600.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... ..... | |
| 10,000 | .000267 | .000200 | ..... | ..... | |
| 20,000 | .000600 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000367 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 71,000 | .015333 | .013000 | ..... | ..... | Elastic limit, |
| 72,000 | .016333 | .001000 | ..... | ..... | |
| 76,000 | .020833 | .004500 | ..... | ..... | |
| 80,000 | .024833 | .004000 | ..... | ..... | |
| 84,000 | .030000 | .005167 | ..... | ..... | |
| 88,000 | .035667 | .005667 | ..... | ..... | |
| 92,000 | .044000 | .008333 | ..... | ..... ..... | |
| 96,000 | .055000 | .011000 | ..... | ..... | |
| 104,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 104,450 |
| Elastic limit per square inch of original section | do... | 71,000 |
| Elongation per inch after rupture | inch.. | .2300 |
| Elongation per inch under strain at elastic limit | do... | .015333 |
| Reduction in diameter at point of rupture | do... | .185 |
| Reduction in area after rupture, per cent of original section | | 59.8 |
| Position of rupture | | 1″.25 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.25*, ″.31*, ″.13 |

## No. 6692.

Rolled and annealed barrel.
Marks, R, A M E–600.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000367 | ..... | ..... | |
| 30,000 | .001000 | .000333 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001700 | .000367 | 0. | ..... | |
| 60,000 | .002083 | .000333 | ..... | ..... | |
| 70,000 | .002400 | .000367 | ..... | ..... | |
| 80,000 | .002783 | .000333 | ..... | ..... | |
| 86,000 | .002967 | .000234 | ..... | ..... | Elastic limit. |
| 87,000 | .004500 | .001533 | ..... | ..... | |
| 88,000 | .006333 | .001833 | ..... | ..... | |
| 92,000 | .012833 | .006500 | ..... | ..... | |
| 96,000 | .016667 | .003834 | ..... | ..... | |
| 100,000 | .021000 | .004333 | ..... | ..... | |
| 104,000 | .025000 | .004000 | ..... | ..... | |
| 108,000 | .030333 | .005333 | ..... | ..... | |
| 112,000 | .036333 | .006000 | ..... | ..... | |
| 116,000 | .044333 | .008000 | ..... | ..... | |
| 125,150 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 125,150 |
| Elastic limit per square inch of original section | do... | 86,000 |
| Elongation per inch after rupture | inch.. | .1700 |
| Elongation per inch under strain at elastic limit | do... | .002967 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1".1 from neck |
| Character of broken surface | | fine silky, serrated |
| Elongation of inch sections | | ".10, ".13, ".28* |

## No. 6693.

Rolled and annealed barrel.
Marks, R A M E–580.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000267 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000366 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 77,000 | .002600 | .000267 | ..... | ..... | Elastic limit. |
| 78,000 | .013667 | .011067 | ..... | ..... | |
| 79,000 | .015000 | .001333 | ..... | ..... | |
| 80,000 | .015667 | .000667 | ..... | ..... | |
| 84,000 | .020333 | .004666 | ..... | ..... | |
| 88,000 | .024833 | .004500 | ..... | ..... | |
| 92,000 | .030000 | .005167 | ..... | ..... | |
| 96,000 | .036333 | .006333 | ..... | ..... | |
| 100,000 | .045000 | .008667 | ..... | ..... | |
| 110,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 110,500 |
| Elastic limit per square inch of original section | do... | 77,000 |
| Elongation per inch after rupture | incn.. | .1933 |
| Elongation per inch under strain at elastic limit | do... | .002600 |
| Reduction in diameter at point of rupture | do... | .175 |
| Reduction in area after rupture, per cent of original section | | 57.2 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | fine silky, serrated |
| Elongation of inch sections | | ″.36*, ″.13, ″.09 |

## No. 6694.

Rolled and annealed barrel.
Marks, R, A M E–580.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length .3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000267 | .000200 | ..... | ..... | |
| 20,000 | .000600 | .000333 | ..... | ..... | |
| 30,000 | .000933 | .000333 | ..... | ..... | |
| 40,000 | .001300 | .000367 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 80,000 | .002667 | .000334 | ..... | ..... | |
| 83,000 | .002767 | .000100 | ..... | ..... | |
| 84,000 | .002833 | .000066 | ..... | ..... | Elastic limit. |
| | .007667 | .004834 | ..... | ..... | |
| 86,000 | .014167 | .006500 | ..... | ..... | |
| 88,000 | .016000 | .001833 | ..... | ..... | |
| 92,000 | .021000 | .005000 | ..... | ..... | |
| 96,000 | .026000 | .005000 | ..... | ..... | |
| 100,000 | .031667 | .005667 | ..... | ..... | |
| 104,000 | .039000 | .007333 | ..... | ..... | |
| 108,000 | .047333 | .008333 | ..... | ..... | |
| 116,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 116,900 |
| Elastic limit per square inch of original section | do... | 84,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do... | .002833 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | 1" 1 from neck |
| Character of broken surface | | fine silky, serrated |
| Elongation of inch sections | | ".29*, ".18, ".18 |

## No. 6695.

Rolled and annealed barrel.
Marks, R A M E–570
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 68,000 | .002300 | .000300 | ..... | ..... | Elastic limit. |
| 69,000 | .011000 | .008700 | ..... | ..... | |
| 70,000 | .011667 | .000667 | ..... | ..... | |
| 72,000 | .012667 | .001000 | ..... | ..... | |
| 76,000 | .015333 | .002666 | ..... | ..... | |
| 80,000 | .018333 | .003000 | ..... | ..... | |
| 84,000 | .021333 | .003000 | ..... | ..... | |
| 88,000 | .024333 | .003000 | ..... | ..... | |
| 92,000 | .028000 | .003667 | ..... | ..... | |
| 96,000 | .032167 | .004167 | ..... | ..... | |
| 100,000 | .036667 | .004500 | ..... | ..... | |
| 117,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 117,500 |
| Elastic limit per square inch of original section | do... | 68,000 |
| Elongation per inch after rupture | inch.. | .1983 |
| Elongation per inch under strain at elastic limit | do... | .002300 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1″.4 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.10, ″.30*, ″.18 |

## No. 6696.

Rolled and annealed barrel.
Marks, $R_2$ A M E–570.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001300 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000367 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 70,000 | .002333 | .000333 | ..... | ..... | |
| 80,000 | .002667 | .000334 | ..... | ..... | |
| 86,000 | .002967 | .000300 | ..... | ..... | |
| 87,000 | .003000 | .000033 | ..... | ..... | Elastic limit. |
| 88,000 | .020667 | .017667 | ..... | ..... | |
| 92,000 | .026333 | .005666 | ..... | ..... | |
| 96,000 | .031667 | .005334 | ..... | ..... | |
| 100,000 | .038333 | .006666 | ..... | ..... | |
| 104,000 | .048333 | .010000 | ..... | ..... | |
| 114,400 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 114,400 |
| Elastic limit per square inch of original section | do... | 87,000 |
| Elongation per inch after rupture | inch.. | .2033 |
| Elongation per inch under strain at elastic limit | do... | .003000 |
| Reduction in diameter at point of rupture | do... | .175 |
| Reduction in area after rupture, per cent of original section | | 57.2 |
| Position of rupture | | 1″.5 from neck |
| Character of broken surface | | fine silky, serrated |
| Elongation of inch sections | | ″.11, ″.37*, ″.13 |

## TABULATION OF TENSION SPECIMENS FROM ROLLED BARRELS AND ROLLED AND ANNEALED BARRELS.

### ROLLED BARRELS.

| No. of test. | Marks. | Diameter. | Sectional area. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation in 3 inches. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Per cent.* | *Per cent.* | | *" " "* | |
| 6653 | R B E-940 | 0.505 | 0.20 | 65,000 | 105,050 | 16.0 | 49.1 | Fine silky | .08, .15, .25* | |
| 6654 | R B E-810 | .505 | .20 | 68,000 | 116,000 | 18.3 | 51.9 | .....do | .19, .27*, .09 | |
| 6655 | R B E-740 | .505 | .20 | 78,000 | 112,000 | 21.7 | 54.6 | Fine silky, cup shaped | .12, .36*, .17 | |
| 6656 | R B E-730 | .505 | .20 | 75,000 | 113,900 | 20.7 | 54.6 | .....do | .13, .38*, .11 | |
| 6657 | R B E-650 | .505 | .20 | 78,000 | 112,000 | 20.0 | 54.6 | .....do | .37*, .13, .10 | |
| 6658 | R B E-600 | .505 | .20 | 84,000 | 119,050 | 13.7 | 49.1 | .....do | .05, .08, .28* | |
| 6659 | R B E-580 | .505 | .20 | 88,000 | 117,900 | 13.7 | 49.1 | .....do | .05, .07, .29* | |
| 6660 | R B E-540 | .505 | .20 | 89,000 | 120,100 | 12.7 | 49.1 | .....do | .29*, .05, .04 | |
| 6661 | $R_2$B E-540 | .505 | .20 | 88,000 | 120,500 | 12.7 | 49.1 | .....do | .04, .07, .27* | |
| 6662 | $R_3$B E-540 | .505 | .20 | 86,000 | 119,800 | 13.3 | 49.1 | .....do | .29*. .06, .05 | |
| 6663 | R B E-510 | .505 | .20 | 73,000 | 117,000 | 17.3 | 51.9 | .....do | .09, .11, .32* | |
| 6664 | R B E-500 | .505 | .20 | 96,000 | 127,600 | 10.0 | 43.3 | .....do | .03, .03, .24* | |
| 6665 | R M E-940 | .505 | .20 | 78,000 | 119,550 | 17.7 | 51.9 | .....do | .08, .13, .32* | |
| 6666 | R M E-810 | .505 | .20 | 78,000 | 117,100 | 19.3 | 54.6 | .....do | .11, .35* .12 | |
| 6667 | R M E-740 | .505 | .20 | 90,000 | 117,400 | 21.0 | 57.2 | .....do | .13, .38*, .12 | |
| 6668 | R M E-730 | .505 | .20 | 83,000 | 116,500 | 20.0 | 54.6 | .....do | .24*, .25*, .11 | |
| 6669 | R M E-650 | .505 | .20 | 96,000 | 117,100 | 22.3 | 57.2 | .....do | .12, .39*, .16 | |
| 6670 | R M E-600 | .505 | .20 | 88,000 | 124,650 | 15.0 | 51.9 | Fine silky, serrated | .07, .09 .29* | |
| 6671 | R M E-580 | .505 | .20 | 91,000 | 128,500 | 16.7 | 51.9 | .....do | .31*, .11, .08 | |
| 6672 | R M E-540 | .505 | .20 | 92,000 | 130,500 | 16.3 | 49.1 | .....do | .10, .30*, .09 | |
| 6673 | $R_2$M E-540 | .505 | .20 | 95,000 | 132,400 | 15.0 | 49.1 | .....do | .09, .26, .10 | |
| 6674 | $R_3$M E-540 | .505 | .20 | 92,000 | 127,050 | 15.0 | 51.9 | .....do | .07, .09, .29* | |
| 6675 | R M E-510 | .505 | .20 | 86,000 | 118,500 | 20.3 | 51.9 | .....do | .12, .32*, .17 | |
| 6676 | R M E-500 | .505 | .20 | 98,000 | 138,450 | 13.3 | 46.2 | .....do | .26*, .09, .05 | |

## *TABULATION OF TENSION SPECIMENS FROM ROLLED BARRELS AND ROLLED AND ANNEALED BARRELS*—Continued.

### ROLLED AND ANNEALED BARRELS.

| No. of test. | Marks. | Diameter. | Sectional area. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation in 3 inches. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Per cent.* | *Per cent.* | | *" " "* | |
| 6677 | R A B E-670 | 0.505 | 0.20 | 67,000 | 114,700 | 20.0 | 51.9 | Fine silky, cup shaped | .12, .36*, .12 | |
| 6678 | R A B E-660 | .505 | .20 | 68,000 | 107,300 | 20.7 | 49.1 | .....do | .28*, .22, .12 | |
| 6679 | R A B E-610 | .505 | .20 | 64,000 | 110,900 | 21.0 | 54.6 | .....do | .13, .37*, .13 | |
| 6680 | R A B E-600 | .505 | .20 | 69,000 | 109,600 | 21.7 | 54.6 | .....do | .11, .37*, .17 | |
| 6681 | $R_2$A B E-600 | .505 | .20 | 67,000 | 110,600 | 19.3 | 57.2 | Fine silky | .35*, .14, .09 | |
| 6682 | $R_2$A B E-600 | .505 | .20 | 75,000 | 121,400 | 14.7 | 49.1 | Fine silky, cup shaped | .29*, .09, .06 | |
| 6683 | R A B E-580 | .505 | .20 | 70,000 | 117,100 | 18.3 | 51.9 | .....do | .10, .13, .32* | |
| 6684 | $R_2$A B E-580 | .505 | .20 | 72,000 | 116,050 | 18.7 | 51.9 | .....do | .11, .13, .32* | |
| 6685 | R A B E-570 | .505 | .20 | 71,000 | 117,550 | 19.0 | 51.9 | .....do | .10, .33*, .14 | |
| 6686 | $R_2$A B E-570 | .505 | .20 | 72,000 | 116,000 | 16.3 | 51.9 | .....do | .31*, .10, .08 | |
| 6687 | R A M E-670 | .505 | .20 | 80,000 | 115,100 | 19.3 | 54.6 | Fine silky, serrated | .17, .31*, .10 | |
| 6688 | R A M E-660 | .505 | .20 | 69,000 | 108,800 | 21.0 | 46.2 | Fine silky, cup shaped | .16, .34*, .13 | |
| 6689 | R A M E-610 | .505 | .20 | 68,000 | 114,850 | 20.3 | 51.9 | .....do | .14, .36*, .11 | |
| 6690 | R A M E-600 | .505 | .20 | 71,000 | 111,700 | 20.0 | 54.6 | .....do | .10, .16, .34 | |
| 6691 | $R_2$A M E-600 | .505 | .20 | 71,000 | 104,450 | 23.0 | 59.8 | .....do | .25, .31*, .13 | |
| 6692 | $R_2$A M E-600 | .505 | .20 | 86,000 | 125,150 | 17.0 | 51.9 | Fine silky, serrated | .10, .13, .28* | |
| 6693 | R A M E-580 | .505 | .20 | 77,000 | 110,500 | 19.3 | 57.2 | .....do | .36*, .13, .09 | |
| 6694 | $R_2$A M E-580 | .505 | .20 | 84,000 | 116,900 | 20.0 | 54.6 | .....do | .29*, .18, .13 | |
| 6695 | R A M E-570 | .505 | .20 | 68 000 | 117,500 | 19.3 | 51.9 | Fine silky, cup shaped | .10, .30*, .18 | |
| 6696 | $R_2$A M E-570 | .505 | .20 | 87,000 | 114,400 | 20.3 | 57.2 | Fine silky, serrated | .11, .37*, .13 | |

# RECEIVER STEEL.

## .30 CALIBER RIFLES.

## No. 6443.

From end of bar.
Marks, R E.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | 0. | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 47,000 | .001600 | .000267 | ..... | ..... | |
| 48,000 | .001633 | .000033 | ..... | ..... | Elastic limit. |
| 49,000 | .021667 | .020034 | ..... | ..... | |
| 50,000 | .023267 | .001600 | ..... | ..... | |
| 51,000 | .024333 | .001066 | ..... | ..... | |
| 52,000 | .026000 | .001667 | ..... | ..... | |
| 54,000 | .029333 | .003333 | ..... | ..... | |
| 56,000 | .033333 | .004000 | ..... | ..... | |
| 58,000 | .037000 | .003667 | ..... | ..... | |
| 60,000 | .042167 | .005167 | ..... | ..... | |
| 62,000 | .046667 | .004500 | ..... | ..... | |
| 64,000 | .053000 | .006333 | ..... | ..... | |
| 66,000 | .061000 | .008000 | ..... | ..... | |
| 76,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 76,100 |
| Elastic limit per square inch of original section | do... | 48,000 |
| Elongation per inch after rupture | inch.. | .2800 |
| Elongation per inch under strain at elastic limit | do... | .001633 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | 1″.7 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ″.21, ″.44*, ″.19 |

No. 6444.

From middle of bar.
Marks, R M.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 74,900 |
| Elastic limit per square inch of original section | do... | 45,000 |
| Elongation per inch after rupture | inch.. | .2700 |
| Elongation per inch under strain at elastic limit | do... | .001567 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | *.20, *.49*, *.18 |

## No. 6445.

From forged receiver after annealing.
Marks, R F 1.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000133 | .000133 | ..... | ..... | |
| 10,000 | .000333 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001000 | .000333 | 0. | ..... | |
| 39,000 | .001300 | .000300 | ..... | ..... | Elastic limit. |
| 40,000 | .001967 | .000667 | ..... | ..... | |
| | .013900 | .011933 | ..... | ..... | |
| 41,000 | .014667 | .000767 | ..... | ..... | |
| 42,000 | .016733 | .002066 | ..... | ..... | |
| 43,000 | .017333 | .000600 | ..... | ..... | |
| 44,000 | .018767 | .001434 | ..... | ..... | |
| 45,000 | .020000 | .001233 | ..... | ..... | |
| 46,000 | .021333 | .001333 | ..... | ..... | |
| 48,000 | .024333 | .003000 | ..... | ..... | |
| 50,000 | .027667 | .003334 | ..... | ..... | |
| 52,000 | .030333 | .002666 | ..... | ..... | |
| 54,000 | .035433 | .005100 | ..... | ..... | |
| 56,000 | .039667 | .004234 | ..... | ..... | |
| 58,000 | .044667 | .005000 | ..... | ..... | |
| 60,000 | .050000 | .005333 | ..... | ..... | |
| 62,000 | .056667 | .006667 | ..... | ..... | |
| 73,050 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 73,050 |
| Elastic limit per square inch of original section | do... | 39,000 |
| Elongation per inch after rupture | inch.. | .2633 |
| Elongation per inch under strain at elastic limit | do... | .001300 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | 1".76 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ".17, ".42*, ".20 |

## No. 6489.

Marks, R 1.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000133 | .000133 | 0. | ..... | |
| 10,000 | .000333 | .000200 | ..... | ..... | |
| 20,000 | .000667 | .000334 | ..... | ..... | |
| 30,000 | .001033 | .000366 | ..... | ..... | |
| 35,000 | .001233 | .000200 | ..... | ..... | |
| 40,000 | .001400 | .000167 | ..... | ..... | |
| 41,000 | .001433 | .000033 | ..... | ..... | |
| 42,000 | .001467 | .000034 | ..... | ..... | |
| 43,000 | .001500 | .000033 | ..... | ..... | |
| 44,000 | .001600 | .000100 | ..... | ..... | Elastic limit. |
| 45,000 | .016333 | .014733 | ..... | ..... | |
| 46,000 | .017333 | .001000 | ..... | ..... | |
| 47,000 | .019267 | .001934 | ..... | ..... | |
| 48,000 | .020000 | .000733 | ..... | ..... | |
| 50,000 | .022500 | .002500 | ..... | ..... | |
| 52,000 | .025667 | .003167 | ..... | ..... | |
| 54,000 | .028667 | .003000 | ..... | ..... | |
| 56,000 | .032067 | .003400 | ..... | ..... | |
| 58,000 | .036333 | .004266 | ..... | ..... | |
| 60,000 | .041167 | .004834 | ..... | ..... | |
| 62,000 | .047500 | .006333 | ..... | ..... | |
| 64,000 | .051433 | .003933 | ..... | ..... | |
| 66,000 | .058833 | .007400 | ..... | ..... | |
| 75,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 75,950 |
| Elastic limit per square inch of original section | do... | 44,000 |
| Elongation per inch after rupture | inch.. | .2700 |
| Elongation per inch under strain at elastic limit | do... | .001600 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | 1",70 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ".19, ".41*, ".21 |

## No. 6524.

Marks, R R 2.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000800 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000833 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | 0. | ..... | |
| 41,000 | .001367 | .000034 | ..... | ..... | |
| 42,000 | .001400 | .000033 | ..... | ..... | |
| 43,000 | .001433 | .000033 | ..... | ..... | Elastic limit. |
| 44,000 | .001633 | .000200 | ..... | ..... | |
| 45,000 | .004000 | .002367 | ..... | ..... | |
| 46,000 | .005833 | .001833 | ..... | ..... | |
| 47,000 | .010333 | .004500 | ..... | ..... | |
| 48,000 | .014000 | .003667 | ..... | ..... | |
| 50,000 | .014767 | .000767 | ..... | ..... | |
| 52,000 | .017000 | .002233 | ..... | ..... | |
| 54,000 | .020000 | .003000 | ..... | ..... | |
| 56,000 | .022667 | .002667 | ..... | ..... | |
| 58,000 | .025333 | .002666 | ..... | ..... | |
| 60,000 | .029000 | .003667 | ..... | ..... | |
| 64,000 | .034667 | .005667 | ..... | ..... | |
| 68,000 | .043000 | .008333 | ..... | ..... | |
| 82,650 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 82,650 |
| Elastic limit per square inch of original section | do... | 43,000 |
| Elongation per inch after rupture | inch.. | .2500 |
| Elongation per inch under strain at elastic limit | do... | .001433 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ".18, ".40, ".17 |

## No. 6525.

Marks, R R 3.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | 0. | ..... | Elastic limit. |
| 41,000 | .001567 | .000234 | ..... | ..... | |
| 42,000 | .009000 | .007433 | ..... | ..... | |
| 43,000 | .016667 | .007667 | ..... | ..... | |
| 44,000 | .017500 | .000833 | ..... | ..... | |
| 45,000 | .018000 | .000500 | ..... | ..... | |
| 46,000 | .019000 | .001000 | ..... | ..... | |
| 48,000 | .021667 | .002667 | ..... | ..... | |
| 50,000 | .024667 | .003000 | ..... | ..... | |
| 52,000 | .028333 | .003666 | ..... | ..... | |
| 54,000 | .032333 | .004000 | ..... | ..... | |
| 56,000 | .036000 | .003667 | ..... | ..... | |
| 58,000 | .041333 | .005333 | ..... | ..... | |
| 60,000 | .046667 | .005334 | ..... | ..... | |
| 73,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 73,900 |
| Elastic limit per square inch of original section | do... | 40,000 |
| Elongation per inch after rupture | inch.. | .2767 |
| Elongation per inch under strain at elastic limit | do... | .001333 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ".18, ".45*, ".20 |

## No. 6642.

Marks, R R 4.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | |
| 47,000 | .001600 | .000267 | ..... | ..... | |
| 48,000 | 001633 | .000033 | ..... | ..... | Elastic limit. |
| 49,000 | .022167 | .020534 | ..... | ..... | |
| 50,000 | .024000 | .001833 | ..... | ..... | |
| 52,000 | .026333 | .002333 | ..... | ..... | |
| 54,000 | .030000 | .003667 | ..... | ..... | |
| 56,000 | .034000 | .004000 | ..... | ..... | |
| 58,000 | .039667 | .005667 | ..... | ..... | |
| 60,000 | .040667 | .001000 | ..... | ..... | |
| 62,000 | .050000 | .009333 | ..... | ..... | |
| 75,950 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 75,950 |
| Elastic limit per square inch of original section | do... | 48,000 |
| Elongation per inch after rupture | inch.. | .2767 |
| Elongation per inch under strain at elastic limit | do... | .001633 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1".7 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ".21, ".44*, ".18 |

## No. 6750.

From forging.
Marks, A.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000267 | .000200 | ..... | ..... | |
| 20,000 | .000600 | .000333 | ..... | ..... | |
| 30,000 | .000933 | .000333 | ..... | ..... | |
| 31,000 | .000967 | .000034 | ..... | ..... | |
| 32,000 | .001000 | .000033 | ..... | ..... | Elastic limit. |
| 33,000 | .013333 | .012333 | ..... | ..... | |
| 34,000 | .020000 | .006667 | ..... | ..... | |
| 35,000 | .022667 | .002667 | ..... | ..... | |
| 36,000 | .025000 | .002333 | ..... | ..... | |
| 38,000 | .029667 | .004667 | ..... | ..... | |
| 40,000 | .036333 | .006666 | ..... | ..... | |
| 42,000 | .043333 | .007000 | ..... | ..... | |
| 44,000 | .050000 | .006667 | ..... | ..... | |
| 56,550 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 56,550 |
| Elastic limit per square inch of original section | do... | 32,000 |
| Elongation per inch after rupture | inch.. | .3500 |
| Elongation per inch under strain at elastic limit | do... | .001000 |
| Reduction in diameter at point of rupture | do... | .215 |
| Reduction in area after rupture, per cent of original section | | 66.9 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky, cup shaped |
| Elongation of inch sections | | ″.24, ″.56*, ″.25 |

## No. 6751.

From forging.
Marks, C.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000800 | .000200 | ..... | ..... | |
| 20,000 | .000833 | .000833 | ..... | ..... | |
| 30,000 | .000967 | .000834 | ..... | ..... | |
| 40,000 | .001300 | .000833 | ..... | ..... | |
| 43,000 | .001400 | .000100 | ..... | ..... | |
| 44,000 | .001433 | .000033 | ..... | ..... | Elastic limit. |
| 45,000 | .016000 | .014567 | ..... | ..... | |
| 46,000 | .017667 | .001667 | ..... | ..... | |
| 47,000 | .019333 | .001666 | ..... | ..... | |
| 48,000 | .020667 | .001334 | ..... | ..... | |
| 50,000 | .023667 | .003000 | ..... | ..... | |
| 52,000 | .026833 | .003166 | ..... | ..... | |
| 54,000 | .031000 | .004167 | ..... | ..... | |
| 56,000 | .035167 | .004167 | ..... | ..... | |
| 58,000 | .039667 | .004500 | ..... | ..... | |
| 60,000 | .045667 | .007000 | ..... | ..... | |
| 74,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 74,050 |
| Elastic limit per square inch of original section | do... | 44,000 |
| Elongation per inch after rupture | inch.. | .2833 |
| Elongation per inch under strain at elastic limit | do... | .001433 |
| Reduction in diameter at point of rupture | do... | .175 |
| Reduction in area after rupture, per cent of original section | | 57.2 |
| Position of rupture | | 1".7 from neck |
| Character of broken surface | | silky, cup shaped |
| Elongation of inch sections | | ".19, ".45*, ".21 |

## No. 6752.

From forging.
Marks, D.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | ..... | ..... | |
| 38,000 | .001233 | .000266 | ..... | ..... | |
| 39,000 | .001300 | .000067 | ..... | ..... | Elastic limit. |
| 40,000 | .011667 | .010367 | ..... | ..... | |
| 41,000 | .012733 | .001066 | ..... | ..... | |
| 42,000 | .013667 | .000934 | ..... | ..... | |
| 44,000 | .016167 | .002500 | ..... | ..... | |
| 46,000 | .018333 | .002166 | ..... | ..... | |
| 50,000 | .025000 | .006667 | ..... | ..... | |
| 54,000 | .031333 | .006333 | ..... | ..... | |
| 58,000 | .040167 | .008834 | ..... | ..... | |
| 62,000 | .051667 | .011500 | ..... | ..... | |
| 75,300 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 75,300 |
| Elastic limit per square inch of original section | do... | 39,000 |
| Elongation per inch after rupture | inch.. | .2633 |
| Elongation per inch under strain at elastic limit | do... | .001300 |
| Reduction in diameter at point of rupture | do... | .185 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky |
| Elongation of inch sections | | ".19, ".40*, ".20 |

## No. 6897.

From forging.
Marks, R R 5.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .000967 | .000334 | 0. | ..... | |
| 40,000 | .001333 | .000366 | ..... | ..... | Elastic limit. |
| | .016333 | .015000 | ..... | ..... | |
| 41,000 | .016833 | .000500 | ..... | ..... | |
| 42,000 | .017333 | .000500 | ..... | ..... | |
| 44,000 | .019667 | .002334 | ..... | ..... | |
| 48,000 | .025667 | .006000 | ..... | ..... | |
| 52,000 | .033667 | .008000 | ..... | ..... | |
| 56,000 | .042667 | .009000 | ..... | ..... | |
| 60,000 | .054167 | .011500 | ..... | ..... | |
| 71,950 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,950 |
| Elastic limit per square inch of original section | do... | 40,000 |
| Elongation per inch after rupture | inch.. | .2600 |
| Elongation per inch under strain at elastic limit | do... | .001333 |
| Reduction in diameter at point of rupture | do... | .14[illegible] |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | 1″.3 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.24, ″.38*, ″.16 |

*TABULATION OF TENSION SPECIMENS FROM STEEL FOR RECEIVERS OF RIFLES (LENGTH OF STEMS 3″).*

| No. of test. | Marks. | Diameter. | Sectional area. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation in 8 inches. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Per cent.* | *Per cent.* | | ″ ″ ″ | |
| 6443 | R E | .505 | .20 | 48,000 | 76,100 | 28.0 | 49.1 | Fine silky | .21, .44*, .19 | From end of bar. |
| 6444 | R M | .505 | .20 | 45,000 | 74,900 | 27.0 | 49.1 | .....do | .20, .43*, .18 | From middle of bar. |
| 6445 | R F 1 | .505 | .20 | 39,000 | 73,050 | 26.3 | 46.2 | .....do | .17, .42*, .20 | From forged receiver after annealing. |
| 6489 | R 1 | .505 | .20 | 44,000 | 75,950 | 27.0 | 46.2 | Silky | .19, .41*, .21 | |
| 6524 | R R 2 | .505 | .20 | 43,000 | 82,650 | 25.0 | 49.1 | Fine silky | .18, .40*, .17 | |
| 6525 | R R 3 | .505 | .20 | 40,000 | 73,900 | 27.7 | 51.9 | .....do | .18, .45*, .20 | |
| 6642 | R R 4 | .505 | .20 | 48,000 | 75,950 | 27.7 | 51.9 | .....do | .21, .44*, .18 | |
| 6750 | A | .505 | .20 | 32,000 | 56,550 | 35.0 | 66.9 | Silky, cup shaped | | From forging. |
| 6751 | C | .505 | .20 | 44,000 | 74,050 | 28.8 | 57.2 | .....do | .19, .45*, .21 | Do. |
| 6752 | D | .505 | .20 | 39,000 | 75,300 | 26.3 | 46.2 | Silky | .19, .40*, .20 | Do. |
| 6897 | R R 5 | .505 | .20 | 40,000 | 71,950 | 26.0 | 49.1 | .....do | .24, .38*, .16 | Do. |

# HYDROSTATIC TESTS

OF

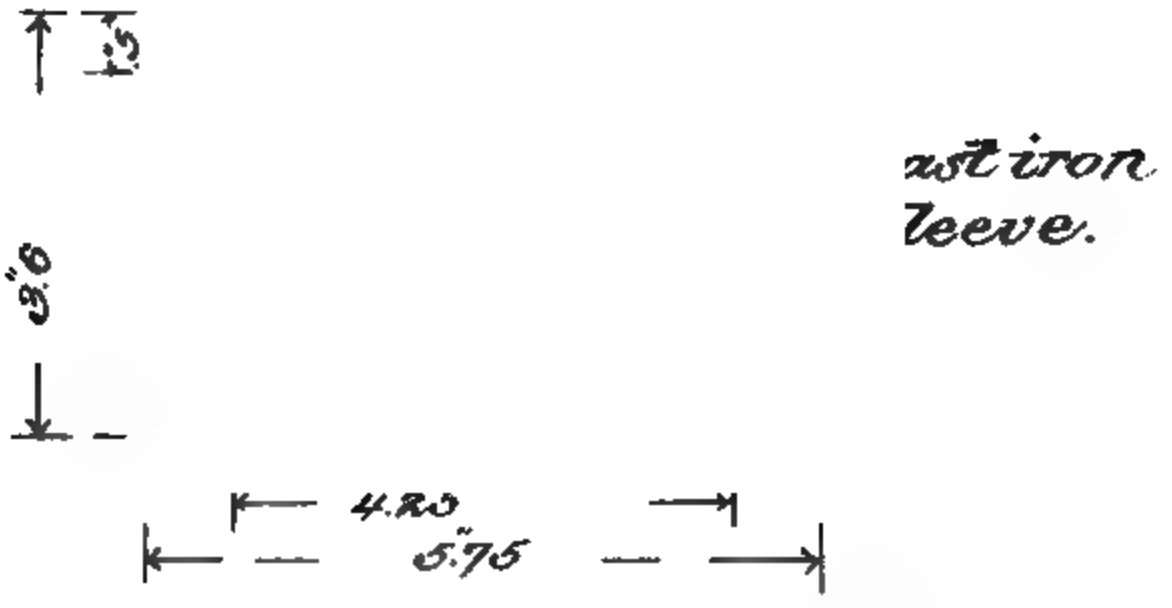
# SECTIONS FROM BREECH OF .30 CALIBER RIFLE BARRELS.

*Rifle Barrels, 30 caliber.*

*Attachment for straining breech sections with hydrostatic pressure.*

*Pi*

*Straining cylinder*




*1st iron sleeve.*

## HYDROSTATIC TESTS OF RIFLE BARRELS.

Two series of tests on sections from the breech ends of .30 caliber barrels by hydrostatic pressure are herewith reported.

The first is a series of bars of experimental barrel steel marked H and L, respectively. The second comprised the tests of 24 barrels made from steel in regular use, there being 6 barrels in a neutral state, also 6 each which had been treated after machine finishing by heating and quenching with oil at the bore from temperatures of 850°, 1,000°, and 1,250°, respectively. Of these latter barrels, one-half the number had been subjected to the further treatment of firing 500 rounds rapidly with service cartridges.

The attachment for straining these breech sections is shown by the accompanying diagram, consisting of a straining cylinder and its piston mounted over the barrel section on a cast-iron sleeve.

Reinforcing rings three-eighths inch long were used on the section under test, leaving an unsupported section of the test piece 1″.85 long. Pressures were applied and the expansion in diameter of the test piece measured at intervals until a maximum stress of 61,120 pounds per square inch was reached, when the tests were discontinued.

The elastic limits of the several barrels was in the vicinity of 36,000 to 40,000 pounds per square inch, excepting those barrels which had been quenched from the temperature of 1,250° F., where higher elastic limits prevailed. Quenching from this temperature produced hardness in a marked degree in a number of the barrels, and one barrel burst while under the maximum pressure—61,120 pounds per square inch.

Tensile tests, representing the metal used in these experiments, follow the details and diagrams of the hydrostatic tests.

## No. 9806.

### Section Marked H.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inches.* | *Inch.* | |
| 16,300 | .980 | .000 | |
| 24,450 | .980+ | .000+ | |
| 28,520 | .980½ | .000½ | |
| 32,600 | .981− | .001− | |
| 34,640 | .981 | .001 | |
| 36,670 | .981+ | .001+ | |
| 38,710 | .982 | .002 | |
| 40,750 | .987+ | .007+ | |
| 16,300 | .987− | .007− | |
| 42,790 | .989 | .009 | |
| 44,820 | .991+ | .011+ | |
| 48,900 | .996 | .016 | |
| 52,970 | 1.000 | .020 | |
| 57,050 | 1.006+ | .026+ | |
| 61,120 | ..... | ..... | Applied, but not measured at the time. |
| 16,300 | 1.015 | ..... | |

## No. 9807.

### Section Marked H.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inches.* | *Inch.* | |
| 16,300 | .979½ | ..... | |
| 24,450 | .979½+ | .000+ | |
| 28,520 | .980− | .000½− | |
| 32,600 | .980 | .000½ | |
| 34,640 | .980 | .000½ | |
| 36,670 | .980+ | .000½+ | |
| 38,710 | .980+ | .000½+ | |
| 40,750 | .980½ | .001 | |
| 16,300 | .980− | .000½− | |
| 42,790 | .981½ | .002 | |
| 44,820 | .986 | .006½ | |
| 46,860 | .988 | .008½ | |
| 48,900 | .990 | .010½ | |
| 52,970 | .994 | .014½ | |
| 57,050 | .997 | .017½ | |
| 61,120 | 1.001+ | .021½+ | |
| 16,300 | 1.000− | .020½− | |

## No. 9806.

### Section Marked H.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inches.* | *Inch.* | |
| 16,300 | .980 | .000 | |
| 24,450 | .980+ | .000+ | |
| 28,520 | .980½ | .000½ | |
| 32,600 | .981− | .001− | |
| 34,640 | .981 | .001 | |
| 36,670 | .981+ | .001+ | |
| 38,710 | .982 | .002 | |
| 40,750 | .987+ | .007+ | |
| 16,300 | .987− | .007− | |
| 42,790 | .989 | .009 | |
| 44,820 | .991+ | .011+ | |
| 48,900 | .996 | .016 | |
| 52,970 | 1.000 | .020 | |
| 57,050 | 1.006+ | .026+ | |
| 61,120 | ..... | ..... | Applied, but not measured at the time. |
| 16,300 | 1.015 | ..... | |

## No. 9807.

### Section Marked H.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inches.* | *Inch.* | |
| 16,300 | .979½ | ..... | |
| 24,450 | .979½+ | .000+ | |
| 28,520 | .980− | .000½− | |
| 32,600 | .980 | .000½ | |
| 34,640 | .980 | .000½ | |
| 36,670 | .980+ | .000½+ | |
| 38,710 | .980+ | .000½+ | |
| 40,750 | .980½ | .001 | |
| 16,300 | .980− | .000½− | |
| 42,790 | .981½ | .002 | |
| 44,820 | .986 | .006½ | |
| 46,860 | .988 | .008½ | |
| 48,900 | .990 | .010½ | |
| 52,970 | .994 | .014½ | |
| 57,050 | .997 | .017½ | |
| 61,120 | 1.001+ | .021½+ | |
| 16,300 | 1.000− | .020½− | |

3

## No. 9808.

### Section Marked L.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inches.* | *Inch.* | |
| 16,300 | .980 | ..... | |
| 24,450 | .980 | .000 | |
| 28,520 | .980+ | .000+ | |
| 32,600 | .980+ | .000+ | |
| 34,640 | .980+ | .000+ | |
| 36,670 | .980½ | .000½ | |
| 38,710 | .981 | .001 | |
| 40,750 | .986 | .006 | |
| 16,300 | .985 | .005 | |
| 42,790 | .988½ | .008½ | |
| 44,820 | .990½ | .010½ | |
| 48,900 | .995 | .015 | |
| 52,970 | .998½ | .018½ | |
| 57,050 | 1.004 | .024 | |
| 61,120 | 1.010½ | .030½ | |
| 16,300 | 1.009 | .029 | |

## No. 9809.

### Section Marked L.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inches.* | *Inch.* | |
| 16,300 | .979½ | ..... | |
| 24,450 | .979½ | .000 | |
| 28,520 | .979½ | .000 | |
| 32,600 | .980— | .000½— | |
| 34,640 | .980 | .000½ | |
| 36,670 | .980+ | .000½+ | |
| 38,710 | .981 | .001½ | |
| 40,750 | .986+ | .006½+ | |
| 16,300 | .986 | .006½ | |
| 42,790 | .988½ | .009 | |
| 44,820 | .990 | .010½ | |
| 48,900 | .994 | .014½ | |
| 52,970 | .997½ | .018 | |
| 57,050 | 1.008— | .023½ | |
| 61,120 | 1.010½ | .031 | |
| 16,300 | 1.009 | .029½ | |

## No. 9810.

## Section Marked Neutral 11–1.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inches.* | *Inch.* | |
| 16,300 | .979⅛ | ..... | |
| 24,450 | .980− | .000⅛− | |
| 28,520 | .980 − | .000⅛ - | |
| 32,600 | .980 | .000⅛ | |
| 34,640 | .980 | .000⅛ | |
| 36,670 | .980+ | .000⅛+ | |
| 38,710 | .983 | .003⅛ | |
| 40,750 | .985⅛ | .006 | |
| 16,300 | .985 | .005⅛ | |
| 42,790 | .987⅛ | .008 | |
| 44,820 | .989⅛ | .010 | |
| 46,860 | .991 | .011⅛ | |
| 48,900 | .992⅛ | .013 | |
| 52,970 | .997 | .017⅛ | |
| 57,050 | 1.001+ | .021⅛+ | |
| 61,120 | 1.007 | .027⅛ | |
| 16,300 | 1.005+ | .025⅛+ | |

## No. 9811.

## Section Marked Neutral 11–2.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inches.* | *Inch.* | |
| 16,300 | .979⅛ | ..... | |
| 24,450 | .979⅛ | .000 | |
| 28,520 | .979⅛ | .000 | |
| 32,600 | .979⅛ | .000 | |
| 34,640 | .980 | .000⅛ | |
| 36,670 | .981 − | .001⅛ - | |
| 38,710 | .982+ | .002⅛+ | |
| 40,750 | .983⅛ | .004 | |
| 16,300 | .983 | .003⅛ | |
| 42,790 | .985+ | .005⅛+ | |
| 44,820 | .987 | .007⅛ | |
| 46,860 | .989 - | .009⅛ • | |
| 48,900 | .990+ | .010⅛+ | |
| 52,970 | .994+ | .014⅛+ | |
| 57,050 | .999 | .019⅛ | |
| 61,120 | 1.005 | .025⅛ | |
| 16,300 | 1.004 | .024⅛ | |

## No. 9812.

## Section Marked Neutral 11–3.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inches.* | *Inch.* | |
| 16,300 | .979 | ..... | |
| 24,450 | .979 | .000 | |
| 28,520 | .979+ | .000+ | |
| 32,600 | .979½ | .000½ | |
| 34,640 | .980− | .001− | |
| 36,670 | .980+ | .001+ | |
| 38,710 | .981 | .002 | |
| 40,750 | .984 | .005 | |
| 16,300 | .983+ | .004+ | |
| 42,790 | .987+ | .008+ | |
| 44,820 | .990 | .011 | |
| 46,860 | .992 | .013 | |
| 48,900 | .994 | .015 | |
| 52,970 | .999− | .020 − | |
| 57,050 | 1.004+ | .025+ | |
| 61,120 | 1.010 | .031 | |
| 16,300 | 1.006+ | .029+ | |

## No. 9813.

## Section Marked 450–11–1.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inches.* | *Inch.* | |
| 16,300 | .979 | ..... | |
| 24,450 | .979+ | .000+ | |
| 28,520 | .979+ | .000+ | |
| 32,600 | .980 | .001 | |
| 34,640 | .980+ | .001+ | |
| 36,670 | .984 | .005 | |
| 38,710 | .988 | .009 | |
| 40,750 | .990½ | .011½ | |
| 16,300 | .990 | .011 | |
| 42,790 | .992 | .013 | |
| 44,820 | .994 | .015 | |
| 46,860 | .996+ | .017+ | |
| 48,900 | .999 | .020 | |
| 52,970 | 1.004+ | .025+ | |
| 57,050 | 1.014½ | .035½ | |
| 61,120 | 1.023 | .044 | |
| 16,300 | 1.022 | .043 | |

## No. 9814.

## Section Marked 450–11–2.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inches.* | *Inch.* | |
| 16,300 | .979½ | ..... | |
| 24,450 | .979½ | .000 | |
| 28,520 | .980− | .000½− | |
| 32,600 | .980 | .000½ | |
| 34,640 | .980 | .000½ | |
| 36,670 | .980½ | .001 | |
| 38,710 | .981½ | .002 | |
| 40,750 | .984+ | .004½+ | |
| 16,300 | .984− | .004½− | |
| 42,790 | .987 | .007½ | |
| 44,820 | .989+ | .009½+ | |
| 46,860 | .991 | .011½ | |
| 48,900 | .993 | .013½ | |
| 52,970 | .997 | .017½ | |
| 57,050 | 1.001 | .021½ | |
| 61,120 | 1.010 | .030½ | |
| 16,300 | 1.008+ | .028½+ | |

## No. 9815.

## Section Marked 450–11–3.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inches.* | *Inch.* | |
| 16,300 | .980 | ..... | |
| 24,450 | .980 | .000 | |
| 28,520 | .980+ | .000+ | |
| 32,600 | .980½ | .000½ | |
| 34,640 | .981 | .001 | |
| 36,670 | .982 | .002 | |
| 38,710 | .984 | .004 | |
| 40,750 | .987+ | .007+ | |
| 16,300 | .986+ | .006+ | |
| 42,790 | .989+ | .009+ | |
| 44,820 | .991 | .011 | |
| 46,860 | .993+ | .013+ | |
| 48,900 | .995 | .015 | |
| 52,970 | .999½ | .019½ | |
| 57,050 | 1.010 | .030 | |
| 61,120 | 1.013½ | .033½ | |
| 16,300 | 1.012+ | .032+ | |

## No. 9816.

## SECTION MARKED 538–11–1.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inches.* | *Inch.* | |
| 16,300 | .979½ | ..... | |
| 14,450 | .979½ | .000 | |
| 28,520 | .980 | .000½ | |
| 32,600 | .980+ | .000½+ | |
| 34,640 | .980+ | .000½+ | |
| 36,670 | .980½ | .001 | |
| 38,710 | .981 | .001½ | |
| 40,750 | .986½ | .007 | |
| 16,300 | .986 | .006½ | |
| 42,790 | .989 | .009½ | |
| 44,820 | .990½ | .011 | |
| 46,860 | .992 | .012½ | |
| 48,900 | .994– | .014½– | |
| 52,970 | .998 | .018½ | |
| 57,050 | 1.003– | .023½– | |
| 61,120 | 1.009 | .029½ | |
| 16,300 | 1.008– | .028½– | |

## No. 9817.

## SECTION MARKED 538–11–2.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inches.* | *Inch.* | |
| 16,300 | .979 | ..... | |
| 24,450 | .979 | .000 | |
| 28,520 | .979 | .000 | |
| 32,600 | .979½ | .000½ | |
| 34,640 | .980– | .001– | |
| 36,670 | .980 | .001 | |
| 38,710 | .981 | .002 | |
| 40,750 | .982+ | .003 | |
| 16,300 | .981½ | .002½ | |
| 42,790 | .987+ | .008+ | |
| 44,820 | .990½ | .011½ | |
| 46,860 | .993– | .014– | |
| 48,900 | .995 | .016 | |
| 52,970 | .999 | .020 | |
| 57,050 | 1.004½ | .025½ | |
| 61,120 | ..... | ..... | Applied but not measured at the time. |
| 16,300 | 1.009½ | .030½ | |

## No. 9818.

### Section Marked 538–11–3.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inches.* | *Inch.* | |
| 16,300 | .979½ | ..... | |
| 24,450 | .979½ | .000 | |
| 28,520 | .980− | .000½− | |
| 32,600 | .980 | .000½ | |
| 34,640 | .980+ | .000½+ | |
| 36,670 | .980½ | .001 | |
| 38,710 | .981 | .001½ | |
| 40,750 | .983+ | .003½+ | |
| 16,300 | .982+ | .002½+ | |
| 42,790 | .990+ | .010½+ | |
| 44,820 | .992 | .012½ | |
| 46,860 | .993½ | .014 | |
| 48,900 | .995½ | .016 | |
| 52,970 | 1.000½ | .021 | |
| 57,050 | 1.009 | .029½ | |
| 61,120 | 1.014 | .034½ | |
| 16,300 | 1.012½ | .033 | |

## No. 9819.

### Section Marked 677–11–1.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inch.* | *Inch.* | |
| 16,300 | .980 | ..... | |
| 24,450 | .980 | .000 | |
| 28,520 | .980 | .000 | The metal at and near the bore was very hard; a lathe tool would not cut it. |
| 32,600 | .980 | .000 | This part of the cross section of the barrel was ground with an emery wheel to face off the end surface of the specimen. |
| 34,640 | .980+ | .000+ | |
| 36,670 | .980+ | .000+ | |
| 38,710 | .980+ | .000+ | |
| 40,750 | .980+ | .000+ | |
| 16,300 | .980 | .000 | |
| 42,790 | .980½ | .000½ | |
| 44,820 | .980½ | .000½ | |
| 46,860 | .980½ | .000½ | |
| 48,900 | .981− | .001− | |
| 52,970 | .981− | .001− | |
| 57,050 | .981 | .001 | |
| 61,120 | ..... | ..... | The barrel burst. |

Rupture occurred along two longitudinal lines, about 100 degrees apart, which were connected by a transverse fracture at the forward end of the threaded section over the breech end of the barrel.

## No. 9820.

## Section Marked 677–11–2.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inch.* | *Inch.* | |
| 16,300 | .979½ | ..... | |
| 24,450 | .979½ | .000 | |
| 28,520 | .979½ | .000 | |
| 32,600 | .980− | .000½− | |
| 34,640 | .980 | .000½ | |
| 36,670 | .980+ | .000½+ | |
| 38,710 | .980+ | .000½+ | |
| 40,750 | .980½ | .001 | |
| 16,300 | .980− | .000½− | |
| 42,790 | .981− | .001½− | |
| 44,820 | .981 | .001½ | |
| 46,860 | .981 | .001½ | |
| 48,900 | .982 | .002½ | |
| 52,970 | .986½ | .007 | |
| 57,050 | .990 | .010½ | |
| 61,120 | ..... | ..... | Applied, but not measured at the time. |
| 16,300 | .993 | .018½ | |

## No. 9821.

## Section Marked 677–11–3.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inch.* | *Inch.* | |
| 16,300 | .980½ | ..... | |
| 24,450 | .980½ | .000 | Hardened metal at the bore of this barrel. |
| 28,520 | .980½ | .000 | |
| 32,600 | .981− | .000½ − | |
| 34,640 | .981− | .000½− | |
| 36,670 | .981− | .000½− | |
| 38,710 | .981− | .000½− | |
| 40,750 | .981 | .000½ | |
| 16,300 | .980+ | −.000½ | |
| 42,790 | .981 | .000½ | |
| 44,820 | .981 | .000½ | |
| 46,860 | .981 | .000½ | |
| 48,900 | .981+ | .000½+ | |
| 52,970 | .982− | .001½− | |
| 57,050 | .983 | .002½ | |
| 61,120 | .984+ | .003½+ | |
| 16,300 | .983½ | .008 | |

## No. 9826.

### Section Marked 450–11–2–500 Rds.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inches.* | *Inch.* | |
| 16,300 | .980 | ..... | |
| 24,450 | .980 | .000 | |
| 28,520 | .980 | .000 | |
| 32,600 | .980 | .000 | |
| 34,640 | .980 | .000 | |
| 36,670 | .980 | .000 | |
| 38,710 | .984− | .004− | |
| 40,750 | .986½ | .006½ | |
| 16,300 | .986− | .006− | |
| 42,790 | .988½ | .008½ | |
| 44,820 | .990½ | .010½ | |
| 46,860 | .993½ | .013½ | |
| 48,900 | .995½ | .015½ | |
| 52,970 | 1.001+ | .021+ | |
| 57,050 | 1.008 | .028 | |
| 61,120 | 1.016+ | .036+ | |
| 16,300 | 1.014½ | .034½ | |

## No. 9827.

### Section Marked 450–11–3–500 Rds.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inches.* | *Inch.* | |
| 16,300 | .980 | ..... | |
| 24,450 | .980 | .000 | |
| 28,520 | .980+ | .000+ | |
| 32,600 | .981 | .001 | |
| 34,640 | .981½ | .001½ | |
| 36,670 | .982 | .002 | |
| 38,710 | .982+ | .002+ | |
| 40,750 | .983− | .003− | |
| 16,300 | .982 | .002 | |
| 42,790 | .983+ | .003+ | |
| 44,820 | .987+ | .007+ | |
| 46,860 | .990 | .010 | |
| 48,900 | .992 | .012 | |
| 52,970 | .996 | .016 | |
| 57,050 | 1.000½ | .020½ | |
| 61,120 | 1.006 | .026 | |
| 16,300 | 1.004½ | .024½ | |

## No. 9828.

## Section Marked 538–11–1–500 Rds.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inches.* | *Inch.* | |
| 16,300 | .980 | ..... | |
| 24,450 | .980 | .000 | |
| 28,520 | .980 | .000 | |
| 32,600 | .980 | .000 | |
| 34,640 | .980+ | .000+ | |
| 36,670 | .980½ | .000½ | |
| 38,710 | .981— | .001— | |
| 40,750 | .982½ | .002½ | |
| 16,300 | .982 | .002 | |
| 42,790 | .989 | .009 | |
| 44,820 | .991½ | .011½ | |
| 46,860 | .993½ | .013½ | |
| 48,900 | .996 | .016 | |
| 52,970 | 1.001+ | .021+ | |
| 57,050 | 1.008½ | .028½ | |
| 61,120 | ..... | ..... | Applied but not measured at the time. |
| 16,300 | 1.014 | .034 | |

## No. 9829.

## Section Marked 538–11–2–500 Rds.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inches.* | *Inch.* | |
| 16,300 | .978½ | ..... | |
| 24,450 | .978½ | .000 | |
| 28,520 | .979— | .000½— | |
| 32,600 | .979½ | .001 | |
| 34,640 | .981— | .002½— | |
| 36,670 | .985 | .006½ | |
| 38,710 | .989 | .010½ | |
| 40,750 | .992 | .013½ | |
| 16,300 | .991 | .012½ | |
| 42,790 | .995— | .016½— | |
| 44,820 | .997— | .018½— | |
| 46,860 | .999 | .020½ | |
| 48,900 | 1.001½ | .023 | |
| 52,970 | 1.010½ | .032 | |
| 57,050 | 1.019 | .040½ | |
| 61,120 | ..... | ..... | Load momentarily reached. |
| 16,300 | 1.021 | .045½ | |

## No. 9830.

### Section Marked 538–11–3–500 Rds.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inches.* | *Inch.* | |
| 16,300 | .980 | ..... | |
| 24,450 | .980 | .000 | |
| 28,520 | .980 | .000 | |
| 32,600 | .980 | .000 | |
| 34,640 | .980 | .000 | |
| 36,670 | .980+ | .000+ | |
| 38,710 | .984 | .004 | |
| 40,750 | .989 | .009 | |
| 16,300 | .988 | .008 | |
| 42,790 | .991 | .011 | |
| 44,820 | .993 | .013 | |
| 46,860 | .995 | .015 | |
| 48,900 | .999 | .019 | |
| 52,970 | 1.007+ | .027+ | |
| 57,050 | 1.011 | .031 | |
| 61,120 | 1.022+ | .042+ | |
| 16,300 | 1.021+ | .041+ | |

## No. 9831.

### Section Marked 677–11–1–500 Rds.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inch.* | *Inch.* | |
| 16,300 | .980 | ..... | |
| 24,450 | .980 | .000 | |
| 28,520 | .980+ | .000+ | |
| 32,600 | .980+ | .000+ | |
| 34,640 | .980+ | .000+ | |
| 36,670 | .980+ | .000+ | |
| 38,710 | .980+ | .000+ | |
| 40,750 | .980+ | .000+ | |
| 16,300 | .980 | .000 | |
| 42,790 | .980+ | .000+ | |
| 44,820 | .980+ | .000+ | |
| 46,860 | .980½ | .000½ | |
| 48,900 | .981 | .001 | |
| 52,970 | .982+ | .002+ | |
| 57,050 | .985— | .005— | |
| 61,120 | .986½ | .006½ | |
| 16,300 | .986— | .006— | |

[redacted]

[redacted]

## No. 9832.

## SECTION MARKED 677–11–2–500 RDS.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inch.* | *Inch.* | |
| 16,300 | 0.980⅛ | 0. | |
| 24,450 | .980⅛ | .000 | |
| 28,520 | .981— | .000⅛— | |
| 32,600 | .981 | .000⅛ | |
| 34,640 | .981 | .000⅛ | |
| 36,670 | .981 | .000⅛ | |
| 38,710 | .981 | .000⅛ | |
| 40,750 | .981+ | .000⅛+ | |
| 16,300 | .980⅛ | .000 | |
| 42,790 | .981+ | .000⅛+ | |
| 44,820 | .981⅛ | .001 | |
| 46,860 | .981⅛ | .001 | |
| 48,900 | .982— | .001⅛— | |
| 52,970 | .984— | .003⅛— | |
| 57,050 | .985⅛ | .005 | |
| 61,120 | .987 | .006⅛ | |
| 16,300 | .986+ | .005⅛+ | |

## No. 9833.

## SECTION MARKED 677–11–3–500 RDS.

| Pressure per square inch. | Barrel section. | | Remarks. |
|---|---|---|---|
| | Diameter. | Expansion. | |
| *Pounds.* | *Inch.* | *Inch.* | |
| 16,300 | 0.980 | 0. | |
| 24,450 | .980 | .000 | |
| 28,520 | .980 | .000 | |
| 32,600 | .980 | .000 | |
| 34,640 | .980 | .000 | |
| 36,670 | .980 | .000 | |
| 38,710 | .980 | .000 | |
| 40,750 | .980 | .000 | |
| 16,300 | .980 | .000 | |
| 42,790 | .980 | .000 | |
| 44,820 | .980 | .000 | |
| 46,860 | .980⅛ | .000⅛ | |
| 48,900 | .981 | .001 | |
| 52,970 | .982⅛ | .002⅛ | |
| 57,050 | .984⅛ | .004⅛ | |
| 61,120 | .986⅛ | .006⅛ | |
| 16,300 | .985⅛ | .005⅛ | |

## SPECIMENS NOS. 6792 TO 6795, INCLUSIVE, TAKEN OVER POWDER CHAMBER OF BARRELS, REPRESENTING THE MATERIAL IN THE HYDROSTATIC TESTS OF BARREL SECTIONS.

### No. 6792.

Marks, Neutral–11.
Sectional area, .25 square inch.
Gauged length, 1″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | 0. | 0. | ..... | ..... | |
| 10,000 | .0001 | .0001 | ..... | ..... | |
| 20,000 | .0004 | .0003 | ..... | ..... | |
| 30,000 | .0009 | .0005 | ..... | ..... | |
| 40,000 | .0012 | .0003 | ..... | ..... | |
| 50,000 | .0018 | .0006 | .0008 | .0003 | |
| 51,000 | .0020 | .0002 | ..... | ..... | |
| 52,000 | .0020 | 0. | ..... | ..... | |
| 53,000 | .0020 | 0. | ..... | ..... | Elastic limit. |
| 54,000 | .0023 | .0003 | ..... | ..... | |
| 55,000 | .0042 | .0019 | ..... | ..... | |
| 56,000 | .0056 | .0014 | ..... | ..... | |
| 57,000 | .0061 | .0005 | ..... | ..... | |
| 58,000 | .0074 | .0013 | ..... | ..... | |
| 60,000 | .0093 | .0019 | ..... | ..... | |
| 64,000 | .0130 | .0037 | ..... | ..... | |
| 68,000 | .0170 | .0040 | ..... | ..... | |
| 72,000 | .0210 | .0040 | ..... | ..... | |
| 76,000 | .0260 | .0050 | ..... | ..... | |
| 80,000 | .0310 | .0050 | ..... | ..... | |
| 98,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 98,400 |
| Elastic limit per square inch of original section | do... | 53,000 |
| Elongation per inch after rupture | inch.. | .80 |
| Elongation per inch under strain at elastic limit | do... | .0020 |
| Reduction in diameter at point of rupture (exterior) | do... | .1208 |
| Character of broken surface | | silky, cup shaped |

## No. 6793.

Marks, 450–11.
Sectional area, .25 square inch.
Gauged length, 1″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | 0. | 0. | ..... | ..... | |
| 10,000 | .0001 | .0001 | ..... | ..... | |
| 20,000 | .0003 | .0002 | ..... | ..... | |
| 30,000 | .0006 | .0003 | ..... | ..... | |
| 40,000 | .0009 | .0003 | ..... | ..... | |
| 50,000 | .0011 | .0002 | 0. | ..... | |
| 56,000 | .0013 | .0002 | ..... | ..... | Elastic limit. |
| 57,000 | .0075 | .0062 | ..... | ..... | |
| 58,000 | .0110 | .0035 | ..... | ..... | |
| 60,000 | .0160 | .0050 | ..... | ..... | |
| 64,000 | .0200 | .0040 | ..... | ..... | |
| 68,000 | .0250 | .0050 | ..... | ..... | |
| 72,000 | .0310 | .0060 | ..... | ..... | |
| 76,000 | .0370 | .0060 | ..... | ..... | |
| 80,000 | .0455 | .0085 | ..... | ..... | |
| 94,160 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 94,160 |
| Elastic limit per square inch of original section | do... | 56,000 |
| Elongation per inch after rupture | inch.. | .31 |
| Elongation per inch under strain at elastic limit | do... | .0013 |
| Reduction in diameter at point of rupture (exterior) | do... | .1308 |
| Character of broken surface | | silky, cup shaped |

## No. 6794.

Marks, 538–11.
Sectional area, .25 square inch.
Gauged length, 1″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .0001 | .0001 | ..... | ..... | |
| 10,000 | .0003 | .0002 | ..... | ..... | |
| 20,000 | .0006 | .0003 | ..... | ..... | |
| 30,000 | .0009 | .0003 | ..... | ..... | |
| 40,000 | .0012 | .0003 | ..... | ..... | |
| 50,000 | .0017 | .0005 | .0001 | .0001 | |
| 60,000 | .0020 | .0003 | ..... | ..... | |
| 61,000 | .0021 | .0001 | ..... | ..... | Elastic limit. |
| 62,000 | .0065 | .0044 | ..... | ..... | |
| 63,000 | .0085 | .0020 | ..... | ..... | |
| 64,000 | .0105 | .0020 | ..... | ..... | |
| 68,000 | .0140 | .0035 | ..... | ..... | |
| 72,000 | .0175 | .0035 | ..... | ..... | |
| 76,000 | .0210 | .0035 | ..... | ..... | |
| 80,000 | .0255 | .0045 | ..... | ..... | |
| 84,000 | .0300 | .0045 | ..... | ..... | |
| 88,000 | .0360 | .0060 | ..... | ..... | |
| 92,000 | .0430 | .0070 | ..... | ..... | |
| 105,600 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 105,600 |
| Elastic limit per square inch of original section | do... | 61,000 |
| Elongation per inch after rupture | inch.. | .27 |
| Elongation per inch under strain at elastic limit | do... | .0021 |
| Reduction in diameter at point of rupture (exterior) | do... | .1308 |
| Character of broken surface | | silky, cup shaped |

## No. 6795.

Marks, 677–11.
Sectional area, .25 square inch.
Gauged length, 1″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | 0. | 0. | 0. | ..... | |
| 10,000 | .0002 | .0002 | ..... | ..... | |
| 20,000 | .0004 | .0002 | ..... | ..... | |
| 30,000 | .0008 | .0004 | ..... | ..... | |
| 40,000 | .0011 | .0003 | ..... | ..... | |
| 50,000 | .0013 | .0002 | ..... | ..... | |
| 60,000 | .0017 | .0004 | ..... | ..... | |
| 70,000 | .0020 | .0003 | ..... | ..... | |
| 78,000 | .0022 | .0002 | ..... | ..... | |
| 79,000 | .0023 | .0001 | ..... | ..... | Elastic limit. |
| 80,000 | .0050 | .0027 | ..... | ..... | |
| 81,000 | .0060 | .0010 | ..... | ..... | |
| 82,000 | .0071 | .0011 | ..... | ..... | |
| 84,000 | .0100 | .0029 | ..... | ..... | |
| 88,000 | .0125 | .0025 | ..... | ..... | |
| 92,000 | .0151 | .0026 | ..... | ..... | |
| 96,000 | .0180 | .0029 | ..... | ..... | |
| 100,000 | .0220 | .0040 | ..... | ..... | |
| 124,720 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 124,720 |
| Elastic limit per square inch of original section | do... | 79,000 |
| Elongation per inch after rupture | inch.. | .21 |
| Elongation per inch under strain at elastic limit | do... | .0023 |
| Reduction in diameter at point of rupture (exterior) | do... | .1008 |
| Character of broken surface | | silky, cup shaped |

## Bolt Steel for .30 Caliber Rifle Barrels.

### No. 6813

Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000333 | .000233 | ..... | ..... | |
| 20,000 | .000700 | .000367 | ..... | ..... | |
| 30,000 | .001067 | .000367 | 0. | ..... | |
| 40,000 | .001433 | .000366 | 0. | ..... | |
| 50,000 | .001800 | .000367 | ..... | ..... | |
| 56,000 | .001967 | .000167 | ..... | ..... | |
| 57,000 | .002033 | .000066 | ..... | ..... | Elastic limit. |
| 58,000 | .010000 | .007967 | ..... | ..... | |
| 59,000 | .010233 | .000233 | ..... | ..... | |
| 60,000 | .010600 | .000367 | ..... | ..... | |
| 62,000 | .011333 | .000733 | ..... | ..... | |
| 64,000 | .012667 | .001334 | ..... | ..... | |
| 68,000 | .015333 | .002666 | ..... | ..... | |
| 72,000 | .018500 | .003167 | ..... | ..... | |
| 76,000 | .021167 | .002667 | ..... | ..... | |
| 80,000 | .024333 | .003166 | ..... | ..... | |
| 84,000 | .028000 | .003667 | ..... | ..... | |
| 88,000 | .036000 | .008000 | ..... | ..... | |
| 108,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 108,000 |
| Elastic limit per square inch of original section | do... | 57,000 |
| Elongation per inch after rupture | inch.. | .1400 |
| Elongation per inch under strain at elastic limit | do... | .002033 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 80.7 |
| Position of rupture | | ".8 from neck |
| Character of broken surface | | granular at circumference 60 per cent, silky center 40 per cent |
| Elongation of inch sections | | ".22*, ".13, ".07 |

## TENSION TESTS OF RECEIVERS OF .30 CALIBER RIFLE BARRELS.

| No. of test. | Marks. | Tensile strength. |
|---|---|---|
| | | *Pounds.* |
| 9834 | Regular stock | 20,900 |
| 9835 | .....do | 35,280 |
| 9836 | .....do | 25,340 |
| 9837 | Special A | 19,850 |
| 9838 | .....do | 30,300 |
| 9839 | .....do | 31,710 |
| 9840 | Special C | 15,700 |
| 9841 | .....do | 26,490 |
| 9842 | .....do | 25,780 |
| 9843 | Special D | 20,800 |
| 9844 | .....do | 27,400 |
| 9845 | .....do | 24,980 |

The first test of each group of receivers was made by an attachment in the testing machine, in which the forward end of the sample was secured by means of a threaded plug occupying the place of the breech end of the barrel. A key in a yoke passed diametrically through the central part of the receiver and took a bearing on the receiver at the two different levels abreast the rear of the magazine. In each of these tests the receiver fractured at the key seat.

An additional yoke was made by means of which the stress on the key seat was in part relieved by pulling simultaneously against the forward end of the lower part of the receiver.

The second and third tests of each group of receivers were made with this modified attachment.

The fractures were now at the end of the threaded section in whole, or at this place in part and abreast the rear of the magazine in part. The fractures throughout were fine granular, with a silvery luster.

## Steel for Pressure Barrels.

### No. 6753.

Marks, S P.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000900 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | ..... | ..... | |
| 60,000 | .002000 | .000333 | 0. | ..... | |
| 63,000 | .002100 | .000100 | ..... | ..... | |
| 64,000 | .002133 | .000033 | ..... | ..... | Elastic limit. |
| 65,000 | .010833 | .008700 | ..... | ..... | |
| 66,000 | .011167 | .000334 | ..... | ..... | |
| 67,000 | .011433 | .000266 | ..... | ..... | |
| 68,000 | .012000 | .000567 | ..... | ..... | |
| 72,000 | .015833 | .003833 | ..... | ..... | |
| 76,000 | .018500 | .002667 | ..... | ..... | |
| 80,000 | .022600 | .004100 | ..... | ..... | |
| 84,000 | .026167 | .003567 | ..... | ..... | |
| 88,000 | .031333 | .005166 | ..... | ..... | |
| 92,000 | .036667 | .005334 | ..... | ..... | |
| 96,000 | .043667 | .007000 | ..... | ..... | |
| 100,000 | .050667 | .007000 | ..... | ..... | |
| 109,150 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 109,150 |
| Elastic limit per square inch of original section | do... | 64,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do... | .002133 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | 1″.5 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ″.12, ″.33*, ″.15 |

# CASE-HARDENING EXPERIMENTS WITH STEEL BARS.

## CASE-HARDENING EXPERIMENTS.

Case-hardening experiments were made with steel containing in the original bars the following percentages of carbon: .16, .34, .55, .73, .82, and 1.09, as shown by the distinguishing marks on the specimens.

In the additional marks the letter T stands for temperature of the case-hardening furnace, N for normal, L for low, and E for exposure; P for prolonged.

The normal temperatures ranged from 730° C. to 920° C.; low temperatures from 740° C. to 840° C.

The time of exposure to heat in the furnace was three hours for the normal time and four hours for prolonged.

There were specimens which were merely heated to the temperature of the furnace, being packed in lime at the time, and not case-hardened nor quenched in oil, as done with the others of the treated bars. The treatment of the bars was done at the Springfield Armory.

There were specimens with both solid and hollow stems, having sectional areas of one-fourth and one-fifth square inch respectively. The stems were 3 inches long each.

Elongations under stress were measured between reference points established on the heads of the specimens, this being done to avoid disturbance of the metal in the stem by marks necessary to define the limits of the gauged length.

The results are, therefore, not reduced to elongations per linear inch. The elastic limits of the case-hardened bars were less sharply defined than the original bars.

Following the tension tests, specimens were annealed to permit turning down in the lathe, and chips for carbon by color determinations turned off the stems.

With the first two specimens the determinations were with chips taken each thirty-second of an inch in depth; in the remaining cases the chips were taken each one hundredth of an inch in depth.

The results were reported as follows:

| Marks. | Chips, depth from surface. | Carbon by color. |
|---|---|---|
| | *Inch.* | |
| .16 C TN EP | First 32d | .215 |
| | Second 32d | .150 |
| | Third 32d | .140 |
| | Fourth 32d | .140 |
| | Fifth 32d | .142 |
| | Sixth 32d | .140 |
| | Seventh 32d | .140 |
| .16 C TL EP | First 32d | .260 |
| | Second 32d | .125 |
| | Third 32d | .125 |
| | Fourth 32d | .120 |
| | Fifth 32d | .120 |
| | Sixth 32d | .120 |
| | Seventh 32d | .120 |
| .16 C TN EN | First 100th | .12 |
| | Second 100th | .12 |
| | Third 100th | .12 |
| | Fourth 100th | .12 |
| | Fifth 100th | .12 |
| .16 C TL EN | First 100th | .22 |
| | Second 100th | .19 |
| | Third 100th | .15 |
| | Fourth 100th | .14 |
| | Fifth 100th | .14 |
| .16 C TL EP | First 100th | .29 |
| | Second 100th | .28 |
| | Third 100th | .20 |
| | Fourth 100th | .15 |
| | Fifth 100th | .15 |
| .34 C TN EN | First 100th | .34 |
| | Second 100th | .33 |
| | Third 100th | .33 |
| | Fourth 100th | .33 |
| | Fifth 100th | .33 |
| .34 C TN EP | First 100th | .60 |
| | Second 100th | .45 |
| | Third 100th | .45 |
| | Fourth 100th | .45 |
| | Fifth 100th | .43 |
| .34 C TL EN | First 100th | .50 |
| | Second 100th | .45 |
| | Third 100th | .40 |
| | Fourth 100th | .40 |
| | Fifth 100th | .40 |
| .34 C TL EP | First 100th | .60 |
| | Second 100th | .48 |
| | Third 100th | .48 |
| | Fourth 100th | .40 |
| | Fifth 100th | .40 |
| .55 C TN EN | First 100th | .78 |
| | Second 100th | .78 |
| | Third 100th | .76 |
| | Fourth 100th | .71 |
| | Fifth 100th | .70 |
| .73 C TN EN | First 100th | .94 |
| | Second 100th | .92 |
| | Third 100th | .84 |
| | Fourth 100th | .84 |
| | Fifth 100th | .83 |
| .82 C TN EN | First 100th | 1.10 |
| | Second 100th | 1.00 |
| | Third 100th | 1.00 |
| | Fourth 100th | .96 |
| | Fifth 100th | .96 |
| 1.03 C TN EN | First 100th | 1.14 |
| | Second 100th | 1.13 |
| | Third 100th | 1.13 |
| | Fourth 100th | 1.13 |
| | Fifth 100th | 1.13 |

## Tension Tests.

### No. 7041.

Steel in natural state, turned down from hot rolled bar.
Marks, .16 C.
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0013 | .0009 | ..... | |
| 20,000 | .0028 | .0015 | 0. | |
| 30,000 | .0039 | .0011 | ..... | |
| 40,000 | .0052 | .0013 | 0. | |
| 43,200 | .0057 | .0005 | ..... | Elastic limit. |
| 44,000 | .1130 | .1073 | ..... | |
| 45,000 | .1200 | .0070 | ..... | |
| 46,000 | .14 | .02 | ..... | |
| 48,000 | .18 | .04 | ..... | |
| 50,000 | .20 | .02 | ..... | |
| 52,000 | .25 | .05 | ..... | |
| 56,000 | .37 | .12 | ..... | |
| 58,840 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 58,840 |
| Elastic limit per square inch of original section | do... | 43,200 |
| Elongation after rupture | inch.. | 1.04 |
| Elongation under strain at elastic limit | do... | .0057 |
| Reduction in diameter at point of rupture | do... | .224 |
| Reduction in area after rupture, per cent of original section | | 68.7 |
| Position of rupture | | 1".75 from neck |
| Character of broken surface | | fine silky |

## No. 7042.

Steel in natural state turned down from hot rolled bar.
Marks, .16 C.
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0013 | .0009 | ..... | |
| 20,000 | .0027 | .0014 | ..... | |
| 30,000 | .0040 | .0013 | 0. | |
| 39,000 | .0054 | .0014 | ..... | |
| 40,000 | .0058 | .0004 | .0001 | |
| 46,000 | .0064 | .0006 | ..... | Elastic limit. |
| 47,000 | .1290 | .1226 | ..... | |
| 48,000 | .1400 | .0110 | ..... | |
| 49,000 | .1480 | .0080 | ..... | |
| 50,000 | .1650 | .0170 | ..... | |
| 52,000 | .20 | .0350 | ..... | |
| 56,000 | .30 | .10 | ..... | |
| 60,000 | .50 | .20 | ..... | |
| 60,960 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| square inch of original section | pounds... | 60,960 |
| re inch of original section | do... | 46,000 |
| ure | inch.. | 1.14 |
| ain at elastic limit | do... | .0064 |
| r at point of rupture | do... | .224 |
| er rupture, per cent of original section | | 55.8 |
| | | 1".58 from neck |
| surface | | fine silky |
| ctions on stem | | ".32, ".54*, ".28 |

## No. 7043.

Steel in natural state, turned down from hot rolled bar.
Marks, .16 C.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0006 | .0008 | 0. | |
| 10,000 | .0017 | .0009 | ..... | |
| 20,000 | .0031 | .0014 | ..... | |
| 30,000 | .0048 | .0017 | .0001 | |
| 40,000 | .0059 | .0011 | ..... | |
| 45,000 | .0066 | .0007 | ..... | Elastic limit. |
| 46,000 | .1200 | .1134 | ..... | |
| 47,000 | .1280 | .0080 | ..... | |
| 48,000 | .1420 | .0140 | ..... | |
| 50,000 | .1690 | .0270 | ..... | |
| 60,720 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 60,720 |
| Elastic limit per square inch of original section | do.... | 45,000 |
| Elongation after rupture | inch.. | 1.02 |
| Elongation under strain at elastic limit | do.... | .0066 |
| Reduction in diameter at point of rupture | do.... | .234 |
| Reduction in area after rupture, per cent of original section | | 65.8 |
| Position of rupture | | 1″.53 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections on stem | | ″.28, ″.49*, ″.21 |

## No. 7056.

Heated in lime, not case hardened.
Marks, $\frac{.16\ C}{TN\ EN}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0010 | .0006 | ..... | |
| 20,000 | .0022 | .0012 | ..... | |
| 30,000 | .0035 | .0013 | 0. | |
| 40,000 | .0048 | .0013 | 0. | Elastic limit. |
| 41,000 | .1210 | .1162 | ..... | |
| 42,000 | .1400 | .0190 | ..... | |
| 44,000 | .17 | .03 | ..... | |
| 46,000 | .20 | .03 | ..... | |
| 48,000 | .25 | .05 | ..... | |
| 50,000 | .30 | .05 | ..... | |
| 55,000 | .58 | .28 | ..... | |
| 55,200 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 55,200 |
| Elastic limit per square inch of original section | do... | 40,000 |
| Elongation after rupture | inch.. | 1.11 |
| Elongation under strain at elastic limit | do... | .0048 |
| Reduction in diameter at point of rupture | do... | .214 |
| Reduction in area after rupture, per cent of original section | | 61.5 |
| Position of rupture | | 1".6 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections on stem | | ".37, ".48*, ".28 |

## No. 7057.

Heated in lime, not case hardened.
Marks, $\overset{.16\ C}{TN\ EN}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0003 | .0003 | 0. | |
| 10,000 | .0010 | .0007 | ..... | |
| 20,000 | .0022 | .0012 | ..... | |
| 30,000 | .0035 | .0013 | 0. | |
| 38,000 | .0047 | .0012 | ..... | |
| 39,000 | .0049 | .0002 | ..... | Elastic limit. |
| 40,000 | .1130 | .1081 | ..... | |
| 41,000 | .1230 | .0100 | ..... | |
| 42,000 | .1370 | .0140 | ..... | |
| 44,000 | .17 | .0330 | ..... | |
| 46,000 | .20 | .03 | ..... | |
| 48,000 | .25 | .05 | ..... | |
| 50,000 | .29 | .04 | ..... | |
| 55,000 | .60 | .31 | ..... | |
| 55,280 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 55,280 |
| Elastic limit per square inch of original section | do... | 39,000 |
| Elongation after rupture | inch.. | 1.10 |
| Elongation under strain at elastic limit | do... | .0049 |
| Reduction in diameter at point of rupture | do... | .224 |
| Reduction in area after rupture, per cent of original section | | 63.7 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections on stem | | ″.25, ″.59*, ″.24 |

## No. 7058.

Heated in lime, not case hardened.
Marks, $\overset{.16\ C}{TN\ EN}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged lengh. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0012 | .0008 | ..... | |
| 20,000 | .0027 | .0015 | ..... | |
| 30,000 | .0040 | .0013 | 0. | |
| 38,000 | .0050 | .0010 | ..... | Elastic limit. |
| 39,000 | .1090 | .1040 | ..... | |
| 40,000 | .1210 | .0120 | ..... | |
| 42,000 | .15 | .0290 | ..... | |
| 44,000 | .18 | .03 | ..... | |
| 46,000 | .21 | .03 | ..... | |
| 48,000 | .26 | .05 | ..... | |
| 50,000 | .31 | .05 | ..... | |
| 54,880 | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 54,880 |
| Elastic limit per square inch of original section | do... | 38,000 |
| Elongation after rupture | inch.. | 1.10 |
| Elongation under strain at elastic limit | do... | .0050 |
| Reduction in diameter at point of rupture | do... | .214 |
| Reduction in area after rupture, per cent of original section | | 61.5 |
| Position of rupture | | 1″.8 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections on stem | | ″.24, ″.59*, ″.24 |

## No. 7059.

Heated in lime, not case hardened.
Marks, $\overset{.16\,C}{TL\,EN}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0005 | .0005 | 0. | |
| 10,000 | .0011 | .0006 | ..... | |
| 20,000 | .0025 | .0014 | ..... | |
| 30,000 | .0039 | .0014 | 0. | |
| 40,000 | .0050 | .0011 | ..... | |
| 43,000 | .0054 | .0004 | ..... | Elastic limit. |
| 44,000 | .1550 | .1496 | ..... | |
| 45,000 | .1630 | .0080 | ..... | |
| 46,000 | .1800 | .0170 | ..... | |
| 48,000 | .24 | .06 | ..... | |
| 50,000 | .29 | .05 | ..... | |
| 55,000 | .53 | .24 | ..... | |
| 55,600 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 55,600 |
| Elastic limit per square inch of original section | do... | 43,000 |
| Elongation after rupture | inch.. | 1.09 |
| Elongation under strain at elastic limit | do... | .0054 |
| Reduction in diameter at point of rupture | do... | .214 |
| Reduction in area after rupture, per cent of original section | | 61.5 |
| Position of rupture | | at middle of the stem |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections on stem | | ″.24, ″.59*, ″.28 |

## No. 7060.

Heated in lime, not case hardened.
Marks, $\frac{16\,C}{TL\,EN}$.
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | [illegible] | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | [illegible]001 | .0007 | ..... | |
| 20,000 | .0024 | 0013 | ..... | |
| 30,000 | .0089 | .0015 | 0. | |
| 40,000 | .0051 | .0012 | ..... | Elastic limit. |
| | .1060 | .1009 | ..... | |
| 41,000 | .1160 | .0100 | ..... | |
| 42,000 | .1290 | .0130 | ..... | |
| 44,000 | .17 | .0410 | ..... | |
| 46,000 | .20 | .03 | ..... | |
| 48,000 | .24 | .04 | ..... | |
| 50,000 | .28 | .04 | ..... | |
| 55,000 | .54 | .26 | ..... | |
| 55,200 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| square inch of original section | pounds.. | 55,200 |
| re inch of original section | do... | 40,000 |
| ure | inch.. | 1.09 |
| in at elastic limit | do... | .0051 |
| r at point of rupture | do... | .294 |
| er rupture, per cent of original section | | 68.7 |
| | | at middle of stem |
| urface | | fine silky, cup shaped |
| ctions on stem | | ".24, ".00°, ".22 |

## No. 7061.

Heated in lime, not case hardened.
Marks, $\overset{.16\ C}{TL\ EN}$.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0010 | .0006 | ..... | |
| 20,000 | .0022 | .0012 | ..... | |
| 30,000 | .0036 | .0014 | 0. | |
| 40,000 | .0049 | .0013 | ..... | |
| 43,000 | .0051 | .0002 | ..... | Elastic limit. |
| | .1355 | .1304 | ..... | |
| 44,000 | .1530 | .0175 | ..... | |
| 46,000 | .19 | .0370 | ..... | |
| 48,000 | .24 | .05 | ..... | |
| 50,000 | .29 | .05 | ..... | |
| 55,000 | .57 | .28 | ..... | |
| 55,240 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 55,240 |
| Elastic limit per square inch of original section | do... | 43,000 |
| Elongation after rupture | inch.. | 1.09 |
| Elongation under strain at elastic limit | do... | .0051 |
| Reduction in diameter at point of rupture | do... | .234 |
| Reduction in area after rupture, per cent of original section | | 65.8 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections on stem | | ″.24, ″.50*, ″.23 |

## No. 7090.

Marks, $\frac{.16\ C}{TN\ EN}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| | *Inch.* | *Inch.* | *Inch.* | |
| | 0. | 0. | 0. | Initial load. |
| | .0002 | .0002 | ..... | |
| | .0009 | .0007 | ..... | |
| | .0020 | .0011 | ..... | |
| | .0031 | .0011 | 0. | |
| | .0047 | .0016 | .0001 | |
| | ..... | ..... | ..... | Elastic limit (approximate). |
| | .0071 | .0024 | .0009 | |
| | .0080 | .0009 | ..... | |
| | .0140 | .0060 | ..... | |
| | .0270 | .0130 | ..... | |
| | .0315 | .0045 | ..... | |
| | .0515 | .0200 | ..... | |
| | .08 | .0285 | ..... | |
| | 12 | .04 | ..... | |
| | .27 | .15 | ..... | |
| | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 89,720 |
| Elastic limit per square inch of original section (approximate) | do... | 48,000 |
| Elongation after rupture | inch.. | .69 |
| Reduction in diameter at point of rupture | do... | .164 |
| Reduction in area after rupture, per cent of original section | | 49.7 |
| Position of rupture | | ".5 from neck |
| Character of broken surface | | silky; opened cracks in surface of stem |

## No. 7091.

Marks, $\overset{.16\ C}{TN\ EN}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0003 | .0003 | 0. | |
| 10,000 | .0010 | .0007 | ..... | |
| 20,000 | .0023 | .0013 | ..... | |
| 30,000 | .0036 | .0013 | .0001 | |
| 40,000 | .0049 | .0013 | .0001 | |
| 50,000 | .0064 | .0015 | ..... | |
| 54,000 | .0070 | .0006 | ..... | |
| 55,000 | .0072 | .0002 | ..... | Elastic limit. |
| 56,000 | .0220 | .0148 | ..... | |
| 58,000 | .0420 | .0200 | ..... | |
| 60,000 | .0490 | .0070 | ..... | |
| 65,000 | .08 | .0310 | ..... | |
| 70,000 | .12 | .04 | ..... | |
| 75,000 | .19 | .07 | ..... | |
| 80,000 | .34 | .15 | ..... | |
| 81,680 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 81,680 |
| Elastic limit per square inch of original section | do... | 55,000 |
| Elongation after rupture | inch.. | .65 |
| Elongation under strain at elastic limit | do... | .0072 |
| Reduction in diameter at point of rupture | do... | .174 |
| Reduction in area after rupture, per cent of original section | | 52.2 |
| Position of rupture | | .6 from neck |
| Character of broken surface | | silky; opened minute cracks in stem |

## No. 7090.

Marks, $\overset{.16\ C}{TN\ EN}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0002 | .0002 | ..... | |
| 10,000 | .0009 | .0007 | ..... | |
| 20,000 | .0020 | .0011 | ..... | |
| 30,000 | .0031 | .0011 | 0. | |
| 40,000 | .0047 | .0016 | .0001 | |
| 48,000 | ..... | ..... | ..... | Elastic limit (approximate). |
| 50,000 | .0071 | .0024 | .0009 | |
| 51,000 | .0080 | .0009 | ..... | |
| 52,000 | .0140 | .0060 | ..... | |
| 54,000 | .0270 | .0130 | ..... | |
| 56,000 | .0315 | .0045 | ..... | |
| 60,000 | .0515 | .0200 | ..... | |
| 65,000 | .08 | .0285 | ..... | |
| 70,000 | .12 | .04 | ..... | |
| 80,000 | .27 | .15 | ..... | |
| 83,720 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 83,720 |
| Elastic limit per square inch of original section (approximate) | do... | 48,000 |
| Elongation after rupture | inch.. | .69 |
| Reduction in diameter at point of rupture | do... | .164 |
| Reduction in area after rupture, per cent of original section | | 49.7 |
| Position of rupture | | ″.5 from neck |
| Character of broken surface | | silky; opened cracks in surface of stem |

## No. 7091.

Marks, $\overset{.16\ C}{TN\ EN}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0003 | .0003 | 0. | |
| 10,000 | .0010 | .0007 | ..... | |
| 20,000 | .0028 | .0018 | ..... | |
| 30,000 | .0036 | .0013 | .0001 | |
| 40,000 | .0049 | .0018 | .0001 | |
| 50,000 | .0064 | .0015 | ..... | |
| 54,000 | .0070 | .0006 | ..... | |
| 55,000 | .0072 | .0002 | ..... | Elastic limit. |
| 56,000 | .0220 | .0148 | ..... | |
| 58,000 | .0420 | .0200 | ..... | |
| 60,000 | .0490 | .0070 | ..... | |
| 65,000 | .08 | .0310 | ..... | |
| 70,000 | .12 | .04 | ..... | |
| 75,000 | .19 | .07 | ..... | |
| 80,000 | .34 | .15 | ..... | |
| 81,680 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 81,680 |
| Elastic limit per square inch of original section | do... | 55,000 |
| Elongation after rupture | inch.. | .65 |
| Elongation under strain at elastic limit | do... | .0072 |
| Reduction in diameter at point of rupture | do... | .174 |
| Reduction in area after rupture, per cent of original section | | 52.2 |
| Position of rupture | | ″.6 from neck |
| Character of broken surface | | silky; opened minute cracks in stem |

## No. 7092.

Marks, $\overset{.16\ C}{TN\ EN}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0007 | .0007 | 0. | |
| 10,000 | .0016 | .0009 | ..... | |
| 20,000 | .0031 | .0015 | ..... | |
| 30,000 | .0048 | .0017 | .0002 | |
| 40,000 | .0060 | .0012 | .0005 | |
| 48,000 | .0068 | .0008 | ..... | |
| 49,000 | .0070 | .0002 | ..... | Elastic limit. |
| 50,000 | .0080 | .0010 | .0018 | |
| 51,000 | .0091 | .0011 | ..... | |
| 52,000 | .0131 | .0040 | ..... | |
| 54,000 | .0240 | .0109 | ..... | |
| 56,000 | .0285 | .0045 | ..... | |
| 60,000 | .0470 | .0185 | ..... | |
| 65,000 | .08 | .0330 | ..... | |
| 70,000 | .11 | .03 | ..... | |
| 75,000 | .17 | .06 | ..... | |
| 80,000 | .23 | .06 | ..... | |
| 84,120 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 84,120 |
| Elastic limit per square inch of original section | do.... | 49,000 |
| Elongation after rupture | inch.. | .63 |
| Elongation under strain at elastic limit | do.... | .0070 |
| Reduction in diameter at point of rupture | do.... | .174 |
| Reduction in area after rupture, per cent of original section | | 52.2 |
| Position of rupture | | ".75 from neck |
| Character of broken surface | | silky, oblique; opened cracks along the stem |

## No. 7054.

Marks, $\overset{.16\ C}{TN\ EP}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0001 | .0001 | 0. | |
| 10,000 | .0006 | .0007 | ..... | |
| 20,000 | .0020 | .0012 | ..... | |
| 30,000 | .0033 | .0013 | ..... | |
| 40,000 | .0048 | .0015 | ..... | |
| 44,000 | ..... | ..... | ..... | Elastic limit, approximate. |
| 46,000 | .0061 | .0013 | .0006 | |
| 48,000 | .0070 | .0009 | ..... | |
| 50,000 | .0104 | .0034 | ..... | |
| 52,000 | .0170 | .0066 | ..... | |
| 54,000 | .0240 | .0070 | ..... | |
| 56,000 | .0320 | .0080 | ..... | |
| 60,000 | .0485 | .0165 | ..... | |
| 65,000 | .08 | .0315 | ..... | |
| 70,000 | .12 | .04 | ..... | |
| 80,000 | .27 | .15 | ..... | |
| 88,680 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 88,680 |
| Elastic limit per square inch of original section (approximate) | do... | 44,000 |
| Elongation after rupture | inch.. | .67 |
| Reduction in diameter at point of rupture | do... | .144 |
| Reduction in area after rupture, per cent of original section | | 44.6 |
| Position of rupture | | ″.40 from neck |
| Character of broken surface | | silky, oblique; opened cracks along surface of stem |

## No. 7093.

Marks, $\frac{.16\ C}{TN\ EP}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0001 | .0001 | 0. | |
| 10,000 | .0007 | .0006 | ..... | |
| 20,000 | .0018 | .0011 | ..... | |
| 30,000 | .0029 | .0011 | —.0001 | |
| 40,000 | .0044 | .0015 | +.0001 | |
| 47,000 | .0060 | .0016 | ..... | Elastic limit. |
| 48,000 | .0069 | .0009 | ..... | |
| 49,000 | .0090 | .0021 | ..... | |
| 50,000 | .0150 | .0060 | ..... | |
| 52,000 | .0280 | .0060 | ..... | |
| 54,000 | .0280 | .0050 | ..... | |
| 56,000 | .0345 | .0065 | ..... | |
| 60,000 | .0480 | .0135 | ..... | |
| 65,000 | .08 | .0320 | ..... | |
| 70,000 | .12 | .04 | ..... | |
| 75,000 | .19 | .07 | ..... | |
| 80,000 | .29 | .10 | ..... | |
| 82,680 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 82,680 |
| Elastic limit per square inch of original section | do... | 47,000 |
| Elongation after rupture | inch.. | .68 |
| Elongation under strain at elastic limit | do... | .0060 |
| Reduction in diameter at point of rupture | do... | .154 |
| Reduction in area after rupture, per cent of original section | | 47.2 |
| Position of rupture | | 1".2 from neck |
| Character of broken surface | | silky, oblique; opened cracks along surface of stem |

## No. 7094.

Marks, $\overset{16\ C}{TL\ EN}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0008 | .0008 | 0. | |
| 10,000 | .0016 | .0008 | ..... | |
| 20,000 | .0028 | .0012 | ..... | |
| 30,000 | .0040 | .0012 | .0001 | |
| 40,000 | .0055 | .0015 | .0002 | |
| 46,000 | ..... | ..... | ..... | Elastic limit, approximate. |
| 50,000 | .0078 | .0023 | .0011 | |
| 51,000 | .0082 | .0004 | ..... | |
| 52,000 | .0107 | .0025 | ..... | |
| 54,000 | .0250 | .0143 | ..... | |
| 56,000 | .0290 | .0040 | ..... | |
| 60,000 | .0485 | .0195 | ..... | |
| 65,000 | .08 | .0315 | ..... | |
| 70,000 | .12 | .04 | ..... | |
| 75,000 | .16 | .04 | ..... | |
| 80,000 | .26 | .10 | ..... | |
| 83,600 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 83,600 |
| Elastic limit per square inch of original section (approximate) | do... | 46,000 |
| Elongation after rupture | inch.. | .68 |
| Reduction in diameter at point of rupture | do... | .184 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | ″.6 from neck |
| Character of broken surface | | silky, oblique; opened minute cracks along surface of stem |

## No. 7095.

Marks, $\overset{16\ C}{TL\ EN}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0007 | .0007 | 0. | |
| 10,000 | .0017 | .0010 | ..... | |
| 20,000 | .0030 | .0013 | ..... | |
| 30,000 | .0044 | .0014 | .0001 | |
| 40,000 | .0059 | .0015 | .0002 | |
| 49,000 | .0071 | .0012 | ..... | Elastic limit. |
| 50,000 | .0079 | .0008 | ..... | |
| 52,000 | .0090 | .0011 | ..... | |
| 54,000 | .0160 | .0070 | ..... | |
| 56,000 | .0335 | .0175 | ..... | |
| 60,000 | .0540 | .0205 | ..... | |
| 65,000 | .08 | .0260 | ..... | |
| 70,000 | .12 | .04 | ..... | |
| 75,000 | .19 | .07 | ..... | |
| 80,000 | .30 | .11 | ..... | |
| 82,400 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 82,400 |
| Elastic limit per square inch of original section | do.... | 49,000 |
| Elongation after rupture | inch.. | .67 |
| Elongation under strain at elastic limit | do.... | .0071 |
| Reduction in diameter at point of rupture | do.... | .184 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | ".55 from neck |
| Character of broken surface | | silky, oblique; opened cracks along surface of stem |

## No. 7055.

Marks, $\frac{.16\ C}{TL\ EP}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0009 | .0009 | 0. | |
| 10,000 | .0021 | .0012 | ..... | |
| 20,000 | .0038 | .0017 | ..... | |
| 30,000 | .0051 | .0013 | .0004 | |
| 37,000 | ..... | ..... | ..... | Elastic limit, approximate. |
| 40,000 | .0068 | .0012 | .0009 | |
| 42,000 | .0070 | .0007 | ..... | |
| 44,000 | .0077 | .0007 | ..... | |
| 46,000 | .0087 | .0010 | ..... | |
| 48,000 | .0118 | .0026 | ..... | |
| 50,000 | .0195 | .0082 | ..... | |
| 55,000 | .0360 | .0165 | ..... | |
| 60,000 | .06 | .0240 | ..... | |
| 65,000 | .09 | .03 | ..... | |
| 70,000 | .13 | .04 | ..... | |
| 75,000 | .20 | .07 | ..... | |
| 80,000 | .32 | .12 | ..... | |
| 82,000 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 82,000 |
| Elastic limit per square inch of original section, approximate | do... | 37,000 |
| Elongation after rupture | inch.. | .65 |
| Reduction in diameter at point of rupture | do... | .134 |
| Reduction in area after rupture, per cent of original section | | 41.9 |
| Position of rupture | | ".65 from neck |
| Character of broken surface | | silky, oblique; opened cracks along surface of stem |

## No. 7096.

Marks, $\overset{.16\ C}{TL\ EP}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | 0. | 0. | 0. | |
| 10,000 | .0008 | .0008 | ..... | |
| 20,000 | .0016 | .0018 | ..... | |
| 30,000 | .0030 | .0014 | ..... | |
| 40,000 | .0042 | .0012 | .0002 | |
| 47,000 | .0051 | .0009 | ..... | Elastic limit. |
| 48,000 | .0060 | .0009 | ..... | |
| 49,000 | .0080 | .0020 | ..... | |
| 50,000 | .0110 | .0030 | ..... | |
| 52,000 | .0190 | .0080 | ..... | |
| 54,000 | .0250 | .0060 | ..... | |
| 56,000 | .0320 | .0070 | ..... | |
| 60,000 | .0510 | .0190 | ..... | |
| 65,000 | .08 | .0290 | ..... | |
| 70,000 | .12 | .04 | ..... | |
| 75,000 | .17 | .05 | ..... | |
| 80,000 | .29 | .12 | ..... | |
| 82,640 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 82,640 |
| Elastic limit per square inch of original section | do... | 47,000 |
| Elongation after rupture | inch.. | .64 |
| Elongation under strain at elastic limit | do... | .0051 |
| Reduction in diameter at point of rupture | do... | .174 |
| Reduction in area after rupture, per cent of original section | | 52.2 |
| Position of rupture | | ″.6 from neck |
| Character of broken surface | | silky; opened cracks along the surface of stem |

## No. 7097.

Marks, $\frac{.16\ C}{TL\ EP}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0006 | .0006 | 0. | |
| 10,000 | .0013 | .0007 | ..... | |
| 20,000 | .0026 | .0013 | ..... | |
| 30,000 | .0040 | .0014 | ..... | |
| 40,000 | .0054 | .0014 | .0003 | |
| 46,000 | .0063 | .0009 | ..... | Elastic limit. |
| 47,000 | .0069 | .0006 | ..... | |
| 48,000 | .0078 | .0009 | ..... | |
| 49,000 | .0110 | .0032 | ..... | |
| 50,000 | .0150 | .0040 | ..... | |
| 52,000 | .0228 | .0078 | .0155 | |
| 54,000 | .0280 | .0052 | ..... | |
| 56,000 | .0312 | .0032 | ..... | |
| 60,000 | .0525 | .0213 | ..... | |
| 65,000 | .07 | .0175 | ..... | |
| 70,000 | .12 | .05 | ..... | |
| 75,000 | .18 | .06 | ..... | |
| 80,000 | .29 | .11 | ..... | |
| 82,480 | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 82,480 |
| Elastic limit per square inch of original section | do... | 46,000 |
| Elongation after rupture | inch.. | .65 |
| Elongation under strain at elastic limit | do... | .0063 |
| Reduction in diameter at point of rupture | do... | .164 |
| Reduction in area after rupture, per cent of original section | | 49.7 |
| Position of rupture | | ″.5 from neck |
| Character of broken surface | | silky; opened cracks in surface of stem |

## No. 7029.

Hollow specimen.
Marks, $\overset{.16\ C}{TN\ EN}$
Exterior diameter, ".588.
Interior diameter, ".300.
Sectional area, .20 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0002 | .0002 | 0. | |
| 10,000 | .0012 | .0010 | ..... | |
| 20,000 | .0029 | .0017 | 0. | |
| 30,000 | .0043 | .0014 | 0. | |
| 39,000 | .0060 | .0017 | ..... | Elastic limit. |
| 40,000 | .0076 | .0016 | .0010 | |
| 41,000 | .0089 | .0013 | ..... | |
| 42,000 | .0095 | .0006 | ..... | |
| 43,000 | .0120 | .0025 | ..... | |
| 44,000 | .0148 | .0028 | ..... | |
| 46,000 | .0230 | .0082 | ..... | |
| 48,000 | .0290 | .0060 | ..... | |
| 50,000 | .0390 | .0100 | .0302 | |
| 60,000 | .12 | .0810 | ..... | |
| 70,000 | .36 | .21 | ..... | |
| 89,000 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 89,000 |
| Elastic limit per square inch of original section (approximate) | do... | 89,000 |
| Elongation after rupture | inch.. | .51 |
| Elongation under strain at elastic limit | do... | .0060 |
| Reduction in diameter at point of rupture (exterior) | do... | .098 |
| Position of rupture | | ".40 from neck |
| Character of broken surface | | silky; opened cracks along the stem |

## No. 7030.

Hollow specimen.
Marks, $\overset{.16\ C}{TN\ EN}$
Exterior diameter, ″.588.
Interior diameter, ″.300.
Sectional area, .20 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0012 | .0008 | ..... | |
| 20,000 | .0030 | .0018 | ..... | |
| 30,000 | .0048 | .0018 | .0001 | |
| 49,000 | .0070 | .0022 | ..... | Elastic limit. |
| 50,000 | .0075 | .0005 | ..... | |
| 51,000 | .0081 | .0006 | ..... | |
| 52,000 | .0090 | .0009 | ..... | |
| 53,000 | .0099 | .0009 | ..... | |
| 54,000 | .0120 | .0021 | ..... | |
| 56,000 | .0190 | .0070 | ..... | |
| 58,000 | .0230 | .0040 | ..... | |
| 60,000 | .0360 | .0130 | ..... | |
| 65,000 | .05 | .0140 | ..... | |
| 70,000 | .08 | .03 | ..... | |
| 75,000 | .11 | .03 | ..... | |
| 80,000 | .18 | .07 | ..... | |
| 85,000 | .24 | .06 | ..... | |
| 89,100 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 89,100 |
| Elastic limit per square inch of original section | do... | 49,000 |
| Elongation after rupture | inch.. | .56 |
| Elongation under strain at elastic limit | do... | .0070 |
| Reduction in diameter at point of rupture (exterior) | do... | .098 |
| Position of rupture | | ″.7 from neck |
| Character of broken surface | | silky; opened cracks along the stem |

## No. 7031.

Hollow specimen.
Marks, $\overset{.16\ C}{TN\ EN}$
Exterior diameter, ".588.
Interior diameter, ".300.
Sectional area, .20 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged lengths. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0002 | .0002 | 0. | |
| 10,000 | .0010 | .0008 | ..... | |
| 20,000 | .0020 | .0010 | ..... | |
| 30,000 | .0033 | .0013 | 0. | |
| 40,000 | .0046 | .0013 | ..... | |
| 50,000 | .0062 | .0016 | ..... | |
| 54,000 | .0073 | .0011 | ..... | Elastic limit. |
| 55,000 | .0082 | .0009 | ..... | |
| 56,000 | .0099 | .0017 | ..... | |
| 57,000 | .0190 | .0091 | ..... | |
| 58,000 | .0220 | .0030 | ..... | |
| 59,000 | .0243 | .0023 | ..... | |
| 60,000 | .0280 | .0037 | ..... | |
| 65,000 | .06 | .0320 | ..... | |
| 70,000 | .10 | .04 | ..... | |
| 75,000 | .13 | .03 | ..... | |
| 80,000 | .19 | .06 | ..... | |
| 85,000 | .29 | .10 | ..... | |
| 87,550 | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 87,550 |
| Elastic limit per square inch of original section | do... | 54,000 |
| Elongation after rupture | inch.. | .61 |
| Elongation under strain at elastic limit | do... | .0073 |
| Reduction in diameter at point of rupture (exterior) | do... | .138 |
| Position of rupture | | 1".4 from neck |
| Character of broken surface | | silky; opened cracks along surface of stem |

## No. 7032.

Hollow specimen.
Marks, $\overset{.16\ C}{TN\ EP}$
Exterior diameter, ″.588.
Interior diameter, ″.300.
Sectional area, .20 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0002 | .0002 | 0. | |
| 10,000 | .0009 | .0007 | ..... | |
| 20,000 | .0020 | .0011 | ..... | |
| 30,000 | .0032 | .0012 | 0. | |
| 40,000 | .0049 | .0017 | ..... | |
| 49,000 | .0063 | .0014 | ..... | Elastic limit. |
| 50,000 | .0076 | .0013 | ..... | |
| 51,000 | .0082 | .0006 | ..... | |
| 52,000 | .0088 | .0006 | ..... | |
| 53,000 | .0091 | .0003 | ..... | |
| 54,000 | .0096 | .0005 | ..... | |
| 55,000 | .0103 | .0007 | ..... | |
| 56,000 | .0111 | .0008 | ..... | |
| 58,000 | .0140 | .0029 | ..... | |
| 60,000 | .0170 | .0030 | ..... | |
| 65,000 | .03 | .0130 | ..... | |
| 70,000 | .04 | .01 | ..... | |
| 75,000 | .07 | .03 | ..... | |
| 80,000 | .10 | .03 | ..... | |
| 85,000 | .14 | .04 | ..... | |
| 90,000 | .20 | .06 | ..... | |
| 96,000 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 96,000 |
| Elastic limit per square inch of original section | do... | 49,000 |
| Elongation after rupture | inch.. | .43 |
| Elongation under strain at elastic limit | do... | .0063 |
| Reduction in diameter at point of rupture (exterior) | do... | .078 |
| Position of rupture | | ″.3 from neck |
| Character of broken surface | | silky, 50 per cent; granular, 50 per cent; cracks along the stem very pronounced. |

## No. 7033.

Hollow specimen.
Marks, $\overset{.18\ C}{TN\ EP}$
Exterior diameter, ".588.
Interior diameter, ".300.
Sectional area, .20 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | ..... | |
| 10,000 | .0010 | .0006 | ..... | |
| 20,000 | .0023 | .0013 | ..... | |
| 30,000 | .0037 | .0014 | 0. | |
| 40,000 | .0051 | .0014 | ..... | |
| 48,000 | .0060 | .0009 | ..... | Elastic limit. |
| 49,000 | .0065 | .0005 | ..... | |
| 50,000 | .0074 | .0009 | .0010 | |
| 51,000 | .0081 | .0007 | ..... | |
| 52,000 | .0088 | .0007 | ..... | |
| 53,000 | .0092 | .0004 | ..... | |
| 54,000 | .0100 | .0008 | ..... | |
| 55,000 | .0112 | .0012 | ..... | |
| 56,000 | .0122 | .0010 | ..... | |
| 58,000 | .0162 | .0040 | ..... | |
| 60,000 | .0200 | .0038 | ..... | |
| 65,000 | .04 | .02 | ..... | |
| 70,000 | .06 | .02 | ..... | |
| 75,000 | .09 | .03 | ..... | |
| 80,000 | .13 | .04 | ..... | |
| 85,000 | .19 | .06 | ..... | |
| 90,000 | .28 | .09 | ..... | |
| 91,550 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 91,550 |
| Elastic limit per square inch of original section | do... | 48,000 |
| Elongation after rupture | inch.. | .47 |
| Elongation under strain at elastic limit | do... | .0060 |
| Reduction in diameter at point of rupture (exterior) | do... | .088 |
| Position of rupture | | ".6 from neck |
| Character of broken surface | | silky; opened cracks in surface of stem |

## No. 7034.

Hollow specimen.
Marks, $\overset{.16\ C}{TN\ EP}$
Exterior diameter, ".588.
Interior diameter, ".300.
Sectional area, .20 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0009 | .0005 | ..... | |
| 20,000 | .0024 | .0015 | ..... | |
| 30,000 | .0040 | .0016 | 0. | |
| 40,000 | .0053 | .0013 | ..... | |
| 47,000 | ..... | ..... | ..... | Elastic limit not well defined. |
| 50,000 | .0083 | .0030 | .0019 | |
| 51,000 | .0092 | .0009 | ..... | |
| 52,000 | .0100 | .0008 | ..... | |
| 53,000 | .0109 | .0009 | ..... | |
| 54,000 | .0123 | .0014 | ..... | |
| 56,000 | .0180 | .0057 | ..... | |
| 58,000 | .0220 | .0040 | ..... | |
| 60,000 | .0277 | .0057 | ..... | |
| 65,000 | .05 | .0223 | ..... | |
| 70,000 | .07 | .02 | ..... | |
| 75,000 | .11 | .04 | ..... | |
| 80,000 | .16 | .05 | ..... | |
| 85,000 | .23 | .07 | ..... | |
| 89,050 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 89,050 |
| Elastic limit per square inch of original section; not well defined | do... | 47,000 |
| Elongation after rupture | inch.. | .54 |
| Reduction in diameter at point of rupture (exterior) | do... | .098 |
| Position of rupture | | ".2 from neck |
| Character of broken surface | | silky; opened cracks in surface of stem |

## No. 7035.

Hollow specimen.
Marks, $\overset{.18\ C}{TL\ EN}$
Exterior diameter ".588.
Interior diameter ".300.
Sectional area, .20 square inch.
Guaged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0014 | .0010 | ..... | |
| 20,000 | .0028 | .0014 | ..... | |
| 30,000 | .0042 | .0014 | .0001 | |
| 39,000 | ..... | ..... | ..... | Elastic limit, approximate. |
| 40,000 | .0058 | .0016 | .0004 | |
| 45,000 | .0066 | .0008 | .0014 | |
| 46,000 | .0072 | .0006 | ..... | |
| 47,000 | .0080 | .0008 | ..... | |
| 48,000 | .0084 | .0004 | ..... | |
| 49,000 | .0066 | .0002 | ..... | |
| 50,000 | .0069 | .0003 | .0022 | |
| 52,000 | .0098 | .0009 | ..... | |
| 54,000 | .0112 | .0014 | ..... | |
| 56,000 | .0130 | .0018 | ..... | |
| 58,000 | .0160 | .0030 | ..... | |
| 60,000 | .0210 | .0050 | ..... | |
| 65,000 | .04 | .0190 | ..... | |
| 70,000 | .06 | .02 | ..... | |
| 75,000 | .09 | .03 | ..... | |
| 80,000 | .13 | .04 | ..... | |
| 85,000 | .18 | .05 | ..... | |
| 90,000 | .27 | .09 | ..... | |
| 93,100 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 93,100 |
| Elastic limit per square inch of original section (approximate) | do.... | 39,000 |
| Elongation after rupture | inch.. | .51 |
| Reduction in diameter at point of rupture (exterior) | do.... | .098 |
| Position of rupture | | ".3 from neck |
| Character of broken surface | | silky 50 per cent, granular 50 per cent. Opened cracks in surface of stem. |

## No. 7036.

Hollow specimen.
Marks, $\overset{.16\,C}{TL\,EN}$
Exterior diameter, ".588.
Interior diameter, ".300.
Sectional area, .20 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0010 | .0006 | ..... | Surface not hardened, can be filed. |
| 20,000 | .0022 | .0012 | ..... | |
| 30,000 | .0035 | .0013 | 0. | |
| 40,000 | .0049 | .0014 | 0. | |
| 50,000 | .0061 | .0012 | ..... | |
| 60,000 | .0075 | .0014 | 0. | |
| 64,000 | .0080 | .0005 | ..... | |
| 65,000 | .0081 | .0001 | ..... | Elastic limit. |
| | .0615 | .0534 | ..... | |
| 66,000 | .0630 | .0015 | ..... | |
| 68,000 | .0755 | .0125 | ..... | |
| 70,000 | .0980 | .0225 | ..... | |
| 75,000 | .14 | .0420 | ..... | |
| 80,000 | .28 | .09 | ..... | |
| 85,000 | .42 | .19 | ..... | |
| 86,000 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 86,000 |
| Elastic limit per square inch of original section | do... | 65,000 |
| Elongation after rupture | inch.. | .57 |
| Elongation under strain at elastic limit | do... | .0081 |
| Reduction in diameter at the point of rupture (exterior) | do... | .128 |
| Position of rupture | | ".85 from neck |
| Character of broken surface | | silky |

## No. 7037.

Hollow specimen.
Marks, $\overset{.16\,C}{TL\,EN}$
Exterior diameter, ".588.
Interior diameter, ".300.
Sectional area, .20 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0011 | .0007 | ..... | |
| 20,000 | .0027 | .0016 | ..... | |
| 30,000 | .0040 | .0013 | ..... | |
| 40,000 | .0052 | .0012 | .0001 | |
| 48,000 | .0071 | .0019 | ..... | |
| 49,000 | .0073 | .0002 | ..... | Elastic limit. |
| 50,000 | .0087 | .0014 | .0020 | |
| 51,000 | .0092 | .0005 | ..... | |
| 52,000 | .0099 | .0007 | ..... | |
| 54,000 | .0115 | .0016 | ..... | |
| 56,000 | .0155 | .0040 | ..... | |
| 58,000 | .0190 | .0035 | ..... | |
| 60,000 | .0240 | .0050 | ..... | |
| 65,000 | .05 | .0260 | ..... | |
| 70,000 | .07 | .02 | ..... | |
| 75,000 | .10 | .03 | ..... | |
| 80,000 | .15 | .05 | ..... | |
| 90,000 | .37 | .22 | ..... | |
| 91,500 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 91,500 |
| Elastic limit per square inch of original section | do... | 49,000 |
| Elongation after rupture | inch.. | .60 |
| Elongation under strain at elastic limit | do... | .0073 |
| Reduction in diameter at point of rupture (exterior) | do... | .108 |
| Position of rupture | | ".85 from neck |
| Character of broken surface | | silky |

## No. 7038.

Hollow specimen.
Marks, $\overset{16\ C}{TL\ EP}$
Exterior diameter, ″.588.
Interior diameter, ″.300.
Sectional area, .20 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0005 | .0005 | 0. | |
| 10,000 | .0014 | .0009 | ..... | |
| 20,000 | .0027 | .0013 | ..... | |
| 30,000 | .0039 | .0012 | .0001 | |
| 38,000 | .0048 | .0009 | ..... | |
| 39,000 | .0050 | .0002 | ..... | Elastic limit. |
| 40,000 | .0058 | .0008 | .0007 | |
| 41,000 | .0061 | .0003 | ..... | |
| 42,000 | .0064 | .0003 | ..... | |
| 43,000 | .0069 | .0005 | ..... | |
| 44,000 | .0072 | .0003 | ..... | |
| 45,000 | .0075 | .0003 | .0019 | |
| 46,000 | .0089 | .0014 | ..... | |
| 50,000 | .0110 | .0021 | ..... | |
| 55,000 | .0220 | .0110 | ..... | |
| 60,000 | .03 | .0080 | ..... | |
| 65,000 | .05 | .02 | ..... | |
| 70,000 | .07 | .02 | ..... | |
| 75,000 | .11 | .04 | ..... | |
| 80,000 | .16 | .05 | ..... | |
| 90,000 | .42 | .26 | ..... | |
| 90,100 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 90,100 |
| Elastic limit per square inch of original section | do... | 39,000 |
| Elongation after rupture | inch.. | .49 |
| Elongation under strain at elastic limit | do... | .0050 |
| Reduction in diameter at point of rupture (exterior) | do... | .068 |
| Position of rupture | | ″.85 from neck |
| Character of broken surface | | granular 80 per cent, silky 20 per cent; opened, very pronounced cracks along surface of stem. |

## No. 7039.

Hollow specimen.
Marks, $\overset{16\ C}{TL\ EP}$
Exterior diameter, ".588.
Interior diameter, ".300.
Sectional area, .20 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0002 | .0002 | 0. | |
| 10,000 | .0006 | .0004 | ..... | |
| 20,000 | .0019 | .0008 | ..... | |
| 30,000 | .0032 | .0013 | 0. | |
| 40,000 | .0050 | .0018 | .0008 | |
| 44,000 | .0061 | .0011 | ..... | Elastic limit, approximate. |
| 45,000 | .0068 | .0007 | .0010 | |
| 46,000 | .0072 | .0004 | ..... | |
| 47,000 | .0080 | .0008 | ..... | |
| 48,000 | .0085 | .0005 | ..... | |
| 49,000 | .0091 | .0006 | ..... | |
| 50,000 | .0100 | .0009 | .0088 | |
| 52,000 | .0120 | .0020 | ..... | |
| 54,000 | .0148 | .0028 | ..... | |
| 56,000 | .0180 | .0037 | ..... | |
| 60,000 | .0278 | .0098 | ..... | |
| 65,000 | .04 | .0127 | ..... | |
| 70,000 | .06 | .02 | ..... | |
| 75,000 | .10 | .04 | ..... | |
| 80,000 | .15 | .05 | ..... | |
| 85,000 | .21 | .06 | ..... | |
| 89,500 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 89,500 |
| Elastic limit per square inch of original section (approximate) | do... | 44,000 |
| Elongation after rupture | inch.. | .43 |
| Elongation under strain at elastic limit | do... | .0061 |
| Reduction in diameter at point of rupture (exterior) | do... | .068 |
| Position of rupture | | ".3 from neck |
| Character of broken surface | | silky 80 per cent, granular 20 per cent. Opened cracks along surface of stem. |

## No. 7040.

Hollow specimen.
Marks, $\overset{16\ C}{TL\ EP}$
Exterior diameter, ″.588.
Interior diameter, ″.300.
Sectional area, .20 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0002 | .0002 | 0. | |
| 10,000 | .0006 | .0006 | ..... | |
| 20,000 | .0020 | .0012 | ..... | |
| 30,000 | .0032 | .0012 | 0. | |
| 35,000 | .0041 | .0009 | ..... | |
| 38,000 | .0049 | .0008 | .0001 | |
| 40,000 | .0053 | .0004 | ..... | Elastic limit. |
| 42,000 | .0060 | .0007 | .0006 | |
| 44,000 | .0070 | .0010 | ..... | |
| 46,000 | .0080 | .0010 | ..... | |
| 48,000 | .0098 | .0018 | ..... | |
| 50,000 | .0113 | .0015 | ..... | |
| 55,000 | .0189 | .0076 | ..... | |
| 60,000 | .0278 | .0089 | ..... | |
| 65,000 | .04 | .0122 | ..... | |
| 70,000 | .07 | .03 | ..... | |
| 75,000 | .11 | .04 | ..... | |
| 80,000 | .16 | .05 | ..... | |
| 85,000 | .24 | .08 | ..... | |
| 87,100 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 87,100 |
| Elastic limit per square inch of original section | do... | 40,000 |
| Elongation after rupture | inch.. | .35 |
| Elongation under strain at elastic limit | do... | .0053 |
| Reduction in diameter at point of rupture | do... | .058 |
| Position of rupture | | ″.3 from neck |
| Character of broken surface | | granular 90 per cent, silky 10 per cent; opened cracks along surface of stem. |

## No. 7044.

Steel in natural state. turned down from hot rolled bar.
Marks, .34 C.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0008 | .0008 | 0. | |
| 10,000 | .0010 | .0007 | ..... | |
| 20,000 | .0021 | .0011 | ..... | |
| 30,000 | .0034 | .0013 | ..... | |
| 40,000 | .0048 | .0014 | 0. | |
| 50,000 | .0060 | .0012 | ..... | |
| 54,000 | .0064 | .0004 | ..... | Elastic limit. |
| 55,000 | .0068 | .0004 | ..... | |
| 56,000 | .0650 | .0582 | ..... | |
| 58,000 | .0690 | .0040 | ..... | |
| 60,000 | .0790 | .0100 | ..... | |
| 65,000 | .10 | .0210 | ..... | |
| 70,000 | .14 | .04 | ..... | |
| 75,000 | .18 | .04 | ..... | |
| 80,000 | .29 | .11 | ..... | |
| 85,000 | .49 | .20 | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 85,000 |
| Elastic limit per square inch of original section | do.... | 54,000 |
| Elongation after rupture | inch.. | .79 |
| Elongation under strain at elastic limit | do.... | .0064 |
| Reduction in diameter at point of rupture | do.... | .174 |
| Reduction in area after rupture, per cent of original section | | 52.2 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky |
| Elongation of inch sections on stem | | ″.17, ″.44*, ″.16 |

## No. 7045.

Steel in natural state, turned down from hot rolled bar.
Marks, .34 C.
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0008 | .0008 | 0. | |
| 10,000 | .0011 | .0008 | ..... | |
| 20,000 | .0025 | .0014 | ..... | |
| 30,000 | .0038 | .0013 | ..... | |
| 40,000 | .0050 | .0012 | 0. | |
| 50,000 | .0062 | .0012 | ..... | |
| 52,000 | .0066 | .0004 | ..... | |
| 53,000 | .0068 | .0002 | ..... | Elastic limit. |
| 54,000 | .0572 | .0504 | ..... | |
| 55,000 | .0590 | .0018 | ..... | |
| 56,000 | .0620 | .0030 | ..... | |
| 60,000 | .0800 | .0180 | ..... | |
| 65,000 | .11 | .03 | ..... | |
| 70,000 | .15 | .04 | ..... | |
| 75,000 | .19 | .04 | ..... | |
| 80,000 | .27 | .08 | ..... | |
| 85,000 | .55 | .28 | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 85,000 |
| Elastic limit per square inch of original section | do... | 53,000 |
| Elongation after rupture | inch.. | .81 |
| Elongation under strain at elastic limit | do... | .0068 |
| Reduction in diameter at point of rupture | do... | .174 |
| Reduction in area after rupture, per cent of original section | | 52.2 |
| Position of rupture | | 1".7 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections on stem | | ".17, ".44*, ".18 |

## No. 7046.

Steel in natural state turned down from hot-rolled bar.
Marks, .34 C.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged lengths. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0011 | .0007 | ..... | |
| 20,000 | .0025 | .0014 | ..... | |
| 30,000 | .0039 | .0014 | ..... | |
| 40,000 | .0051 | .0012 | 0. | |
| 50,000 | .0063 | .0012 | ..... | |
| 52,000 | .0065 | .0002 | ..... | |
| 53,000 | .0067 | .0002 | ..... | Elastic limit. |
| 54,000 | .0590 | .0523 | ..... | |
| 55,000 | .0602 | .0012 | ..... | |
| 56,000 | .0641 | .0039 | ..... | |
| 60,000 | .0802 | .0161 | ..... | |
| 65,000 | .11 | .0298 | ..... | |
| 70,000 | .15 | .04 | ..... | |
| 75,000 | .19 | .04 | ..... | |
| 80,000 | .26 | .07 | ..... | |
| 84,880 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 84,880 |
| Elastic limit per square inch of original section | do... | 53,000 |
| Elongation after rupture | inch.. | .80 |
| Elongation under strain at elastic limit | do.. | .0067 |
| Reduction in diameter at point of rupture | do.. | .174 |
| Reduction in area after rupture, per cent of original section | | 52.2 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky |
| Elongation of inch sections on stem | | ″.17, ″.44*, ″.17 |

## No. 7062.

**Heated in lime, not case hardened.**
**Marks, $\overset{34\ C}{TN\ EN}$**
**Diameter, ″.564.**
**Sectional area, .25 square inch.**
**Gauged length on heads, 4″.**

| Applied loads per square inch. | In gauged lengths. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0005 | .0005 | 0. | |
| 10,000 | .0010 | .0005 | ..... | |
| 20,000 | .0022 | .0012 | ..... | |
| 30,000 | .0037 | .0015 | 0. | |
| 40,000 | .0050 | .0013 | ..... | |
| 48,000 | .0060 | .0010 | ..... | Elastic limit. |
| 49,000 | .0550 | .0490 | ..... | |
| 50,000 | .0590 | .0040 | ..... | |
| 52,000 | .0658 | .0068 | ..... | |
| 54,000 | .0745 | .0087 | ..... | |
| 56,000 | .0860 | .0115 | ..... | |
| 60,000 | .1062 | .0202 | ..... | |
| 65,000 | .14 | .0338 | ..... | |
| 70,000 | .19 | .05 | ..... | |
| 75,000 | .26 | .07 | ..... | |
| 80,000 | .47 | .21 | ..... | |
| 80,720 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 80,720 |
| Elastic limit per square inch of original section | do... | 48,000 |
| Elongation after rupture | inch.. | .81 |
| Elongation under strain at elastic limit | do... | .0060 |
| Reduction in diameter at point of rupture | do... | .154 |
| Reduction in area after rupture, per cent of original section | | 47.2 |
| Position of rupture | | 1″.5 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections on stem | | ″.17, ″.39*, ″.23 |

## No. 7063.

Heated in lime, not case hardened.
Marks, $\overset{.34\,C}{TN\ EN}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0005 | 0.005 | 0. | |
| 10,000 | .0011 | .0006 | ..... | |
| 20,000 | .0021 | .0010 | ..... | |
| 30,000 | .0033 | .0012 | ..... | |
| 40,000 | .0048 | .0015 | 0. | |
| 50,000 | .0060 | .0012 | ..... | Elastic limit. |
| | .0568 | .0508 | ..... | |
| 51,000 | .0587 | .0019 | ..... | |
| 52,000 | .0618 | .0031 | ..... | |
| 54,000 | .0700 | .0082 | ..... | |
| 56,000 | .0780 | .0080 | ..... | |
| 60,000 | .0980 | .0200 | ..... | |
| 65,000 | .13 | .0320 | ..... | |
| 70,000 | .18 | .05 | ..... | |
| 75,000 | .25 | .07 | ..... | |
| 80,000 | .38 | .13 | ..... | |
| 81,600 | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Textile strength per square inch of original section | pounds.. | 81,600 |
| Elastic limit per square inch of original section | do... | 50,000 |
| Elongation after rupture | inch.. | .77 |
| Elongation under strain at elastic limit | do... | .0060 |
| Reduction in diameter at point of rupture | do... | .164 |
| Reduction in area after rupture, per cent of original section | | 49.7 |
| Position of rupture | | 1" from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections on stem | | ".15, ".22, ".37* |

## No. 7064.

Heated in lime, not case hardened.
Marks, $\overset{.34\,C}{TN\ EN}$.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied load per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0005 | .0005 | 0. | |
| 10,000 | .0011 | .0006 | ..... | |
| 20,000 | .0024 | .0013 | ..... | |
| 30,000 | .0037 | .0013 | .0001 | |
| 40,000 | .0050 | .0013 | .0001 | |
| 49,000 | .0060 | .0010 | ..... | Elastic limit. |
| 50,000 | .0570 | .0510 | ..... | |
| 51,000 | .0600 | .0030 | ..... | |
| 52,000 | .0663 | .0063 | ..... | |
| 54,000 | .0780 | .0067 | ..... | |
| 56,000 | .0840 | .0110 | ..... | |
| 60,000 | .11 | .0260 | ..... | |
| 65,000 | .15 | .04 | ..... | |
| 70,000 | .19 | .04 | ..... | |
| 75,000 | .26 | .07 | ..... | |
| 80,000 | .44 | .18 | ..... | |
| 80,400 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 80,400 |
| Elastic limit per square inch of original section | do... | 49,000 |
| Elongation after rupture | inch.. | .81 |
| Elongation under strain at elastic limit | do... | .0060 |
| Reduction in diameter at point of rupture | do... | .154 |
| Reduction in area after rupture, per cent of original section | | 47.2 |
| Position of rupture | | 1″.7 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections or stem | | ″.20, ″.42*, ″.16 |

## No. 7065.

Heated in lime, not case hardened.
Marks, $\overset{34}{TL}\ \overset{C}{EN}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0011 | .0007 | ..... | |
| 20,000 | .0024 | .0013 | ..... | |
| 30,000 | .0038 | .0014 | 0. | |
| 40,000 | .0051 | .0013 | ..... | |
| 49,000 | .0060 | .0009 | ..... | Elastic limit. |
| 50,000 | .0540 | .0580 | ..... | |
| 51,000 | .0580 | .0040 | ..... | |
| 52,000 | .0730 | .0050 | ..... | |
| 54,000 | .0810 | .0080 | ..... | |
| 56,000 | .0915 | .0105 | ..... | |
| 60,000 | .13 | .0385 | ..... | |
| 65,000 | .16 | .03 | ..... | |
| 70,000 | .22 | .06 | ..... | |
| 75,000 | .31 | .09 | ..... | |
| 79,200 | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 79,200 |
| Elastic limit per square inch of original section | do... | 49,000 |
| Elongation after rupture | inch.. | .89 |
| Elongation under strain at elastic limit | do... | .0060 |
| Reduction in diameter at point of rupture | do... | .184 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky |
| Elongation of inch sections on stem | | ".20, ".47*, ".19 |

## No. 7066.

Heated in lime, not case hardened.
Marks, $\overset{.34\ C}{TL\ EN}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0010 | .0006 | ..... | |
| 20,000 | .0021 | .0011 | ..... | |
| 30,000 | .0035 | .0014 | 0. | |
| 40,000 | .0049 | .0014 | ..... | |
| 48,000 | .0059 | .0010 | ..... | Elastic limit. |
| 49,000 | .0600 | .0541 | ..... | |
| 50,000 | .0650 | .0050 | ..... | |
| 51,000 | .0680 | .0030 | ..... | |
| 52,000 | .0723 | .0043 | ..... | |
| 56,000 | .10 | .0277 | ..... | |
| 60,000 | .13 | .03 | ..... | |
| 65,000 | .16 | .03 | ..... | |
| 70,000 | .22 | .06 | ..... | |
| 75,000 | .33 | .11 | ..... | |
| 78,880 | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 78,880 |
| Elastic limit per square inch of original section | do... | 48,000 |
| Elongation after rupture | inch.. | .87 |
| Elongation under strain at elastic limit | do... | .0059 |
| Reduction in diameter at point of rupture | do... | .184 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky |
| Elongation of inch sections on stem | | ″.19, ″.47*, ″.19 |

## No. 7067.

Heated in lime, not case hardened
Marks, $\overset{34\ C}{TL\ EN}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0010 | .0006 | ..... | |
| 20,000 | .0023 | .0013 | ..... | |
| 30,000 | .0038 | .0015 | 0. | |
| 40,000 | .0050 | .0012 | ..... | |
| 48,000 | .0060 | .0010 | ..... | Elastic limit. |
| 49,000 | .0610 | .0550 | ..... | |
| 50,000 | .0643 | .0033 | ..... | |
| 51,000 | .0670 | .0027 | ..... | |
| 52,000 | .0730 | .0060 | ..... | |
| 56,000 | .10 | .0270 | ..... | |
| 60,000 | .12 | .02 | ..... | |
| 65,000 | .16 | .04 | ..... | |
| 70,000 | .22 | .06 | ..... | |
| 75,000 | .31 | .09 | ..... | |
| 78,960 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 78,960 |
| Elastic limit per square inch of original section | do... | 48,000 |
| Elongation after rupture | inch.. | .88 |
| Elongation under strain at elastic limit | do... | .0060 |
| Reduction in diameter at point of rupture | do... | .184 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | 1".7 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections on stem | | ".22, ".45*, ".18 |

## No. 7047.

Marks, $\overset{.34\,C}{TN\ EN}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0003 | .0003 | 0. | |
| 10,000 | .0010 | .0007 | ..... | |
| 20,000 | .0022 | .0012 | ..... | |
| 30,000 | .0037 | .0015 | ..... | |
| 36,000 | .0050 | .0013 | .0002 | |
| 37,000 | ..... | ..... | ..... | Elastic limit (approximate). |
| 40,000 | .0060 | .0010 | .0009 | |
| 44,000 | .0070 | .0010 | ..... | |
| 46,000 | .0078 | .0008 | ..... | |
| 48,000 | .0085 | .0007 | ..... | |
| 50,000 | .0094 | .0009 | .0080 | |
| 55,000 | .0120 | .0026 | ..... | |
| 60,000 | .0180 | .0060 | ..... | |
| 65,000 | .0250 | .0070 | ..... | |
| 70,000 | .0355 | .0105 | ..... | |
| 75,000 | .05 | .0145 | ..... | |
| 80,000 | .07 | .02 | ..... | |
| 85,000 | .09 | .02 | ..... | |
| 90,000 | .11 | .02 | ..... | |
| 95,000 | .14 | .03 | ..... | |
| 100,000 | .19 | .05 | ..... | |
| 105,000 | .30 | .11 | ..... | |
| 106,400 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 106,400 |
| Elastic limit per square inch of original section (approximate) | do... | 37,000 |
| Elongation after rupture | inch.. | .52 |
| Reduction in diameter at point of rupture | do... | .074 |
| Reduction in area after rupture, per cent of original section | | 24.6 |
| Position of rupture | | 1".1 from neck |
| Character of broken surface | | granular, radiating from a silky spot at the circumference; opened minute cracks in surface of stem. |

## No. 7048.

Marks, $\overset{.34\,C}{TN\ EN}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0011 | .0007 | ..... | |
| 20,000 | .0026 | .0015 | ..... | |
| 30,000 | .0040 | .0014 | .0002 | |
| 36,000 | .0050 | .0010 | ..... | Elastic limit (approximate). |
| 37,000 | .0054 | .0004 | ..... | |
| 38,000 | .0060 | .0006 | ..... | |
| 39,000 | .0062 | .0002 | ..... | |
| 40,000 | .0064 | .0002 | .0013 | |
| 41,000 | .0066 | .0002 | ..... | |
| 42,000 | .0069 | .0003 | ..... | |
| 43,000 | .0071 | .0002 | ..... | |
| 44,000 | .0073 | .0002 | ..... | |
| 45,000 | .0078 | .0005 | ..... | |
| 46,000 | .0081 | .0003 | .0022 | |
| 48,000 | .0090 | .0009 | ..... | |
| 50,000 | .0100 | .0010 | ..... | |
| 55,000 | .0126 | .0026 | ..... | |
| 60,000 | .0190 | .0064 | ..... | |
| 65,000 | .0260 | .0070 | ..... | |
| 70,000 | .0353 | .0093 | ..... | |
| 80,000 | .07 | .0347 | ..... | |
| 90,000 | .11 | .04 | ..... | |
| 100,000 | .18 | .07 | ..... | |
| 106,840 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 106,840 |
| Elastic limit per square inch of original section (approximate) | do.... | 36,000 |
| Elongation after rupture | inch.. | .44 |
| Elongation under strain at elastic limit | do.... | .0060 |
| Reduction in diameter at point of rupture | do.... | .054 |
| Reduction in area after rupture, per cent of original section | | 18.3 |
| Position of rupture | | ″.85 from neck |
| Character of broken surface | | granular, radiating from a point in the circumference; opened cracks in surface of stem. |

## No. 7049.

Marks, $\overset{34\ C}{TN\ EN}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0003 | .0003 | 0. | |
| 10,000 | .0009 | .0006 | ..... | |
| 20,000 | .0020 | .0011 | ..... | |
| 30,000 | .0032 | .0012 | 0. | |
| 40,000 | .0046 | .0014 | 0. | |
| 50,000 | .0063 | .0017 | .0001 | Elastic limit. |
| 51,000 | .0068 | .0005 | ..... | |
| 52,000 | .0340 | .0272 | ..... | |
| 53,000 | .0361 | .0021 | ..... | |
| 54,000 | .0387 | .0026 | ..... | |
| 56,000 | .0460 | .0073 | ..... | |
| 60,000 | .0620 | .0160 | ..... | |
| 65,000 | .09 | .0280 | ..... | |
| 70,000 | .12 | .03 | ..... | |
| 80,000 | .22 | .10 | ..... | |
| 86,080 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 86,080 |
| Elastic limit per square inch of original section | do... | 50,000 |
| Elongation after rupture | inch.. | .66 |
| Elongation under strain at elastic limit | do... | .0063 |
| Reduction in diameter at point of rupture | do... | .124 |
| Reduction in area after rupture, per cent of original section | | 89.2 |
| Position of rupture | | ".85 from neck |
| Character of broken surface | | silky, oblique; opened minute cracks in surface of stem |

## No. 7050.

Marks, $\frac{.34\ C}{TN\ EP}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0003 | .0003 | 0. | |
| 10,000 | .0010 | .0007 | ..... | |
| 20,000 | .0022 | .0012 | ..... | |
| 30,000 | .0036 | .0014 | 0. | |
| 40,000 | .0052 | .0016 | .0002 | |
| 42,000 | ..... | ..... | ..... | Elastic limit (approximate). |
| 46,000 | .0070 | .0018 | .0012 | |
| 48,000 | .0079 | .0009 | ..... | |
| 50,000 | .0091 | .0012 | ..... | |
| 52,000 | .0120 | .0029 | ..... | |
| 54,000 | .0160 | .0040 | ..... | |
| 56,000 | .0203 | .0043 | ..... | |
| 60,000 | .0298 | .0095 | ..... | |
| 65,000 | .0410 | .0112 | ..... | |
| 70,000 | .0580 | .0170 | ..... | |
| 80,000 | .11 | .0520 | ..... | |
| 90,000 | .18 | .07 | ..... | |
| 98,040 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Textile strength per square inch of original section | pounds.. | 98,040 |
| Elastic limit per square inch of original section (approximate) | do... | 42,000 |
| Elongation after rupture | inch.. | .55 |
| Reduction in diameter at point of rupture | do... | .104 |
| Reduction in area after rupture, per cent of original section | | 83.5 |
| Position of rupture | | ".85 from neck |
| Character of broken surface | | granular, 70 per cent; silky, 30 per cent; opened cracks in surface of stem. |

## No. 7051.

Marks, $\frac{\text{C}}{\text{TN EP}}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0011 | .0007 | ..... | |
| 20,000 | .0022 | .0011 | ..... | |
| 30,000 | .0038 | .0016 | .0001 | |
| 38,000 | .0044 | .0006 | ..... | Elastic limit. |
| 39,000 | .0051 | .0007 | ..... | |
| 40,000 | .0057 | .0006 | .0009 | |
| 42,000 | .0062 | .0005 | ..... | |
| 44,000 | .0069 | .0007 | ..... | |
| 46,000 | .0076 | .0007 | ..... | |
| 48,000 | .0083 | .0007 | ..... | |
| 50,000 | .0090 | .0007 | ..... | |
| 55,000 | .0114 | .0024 | ..... | |
| 60,000 | .0168 | .0054 | ..... | |
| 65,000 | .0230 | .0062 | ..... | |
| 70,000 | .0330 | .0100 | ..... | |
| 80,000 | .0595 | .0265 | ..... | |
| 90,000 | .10 | .0405 | ..... | |
| 100,000 | .17 | .07 | ..... | |
| 108,200 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 108,200 |
| Elastic limit per square inch of original section | do... | 38,000 |
| Elongation after rupture | inch.. | .88 |
| Elongation under strain at elastic limit | do... | .0044 |
| Reduction in diameter at point of rupture | do... | .034 |
| Reduction in area after rupture, per cent of original section | | 11.8 |
| Position of rupture | | 1" from neck |
| Character of broken surface | | granular; opened cracks in surface of stem |

## No. 7098.

Marks, $\overset{.34\ C}{TN\ EP}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0005 | .0005 | 0. | |
| 10,000 | .0011 | .0006 | ..... | |
| 20,000 | .0023 | .0012 | ..... | |
| 30,000 | .0040 | .0017 | ..... | |
| 38,000 | .0049 | .0009 | ..... | |
| 39,000 | .0051 | .0002 | ..... | Elastic limit. |
| 40,000 | .0060 | .0009 | .0010 | |
| 42,000 | .0069 | .0009 | ..... | |
| 44,000 | .0074 | .0005 | ..... | |
| 46,000 | .0080 | .0006 | ..... | |
| 48,000 | .0089 | .0009 | ..... | |
| 50,000 | .0099 | .0010 | .0081 | |
| 52,000 | .0109 | .0010 | ..... | |
| 56,000 | .0142 | .0033 | ..... | |
| 60,000 | .0176 | .0034 | ..... | |
| 65,000 | .0245 | .0069 | ..... | |
| 70,000 | .0350 | .0105 | ..... | |
| 80,000 | .06 | .0250 | ..... | |
| 90,000 | .10 | .04 | ..... | |
| 100,000 | .19 | .09 | ..... | |
| 106,800 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 106,800 |
| Elastic limit per square inch of original section | do... | 89,000 |
| Elongation after rupture | inch.. | .49 |
| Elongation under strain at elastic limit | do... | .0051 |
| Reduction in diameter at point of rupture | do... | .064 |
| Reduction in area after rupture, per cent of original section | | 21.4 |
| Position of rupture | | 1".6 from neck |
| Character of broken surface | | granular, radiating from a point in the circumference |

## No. 7052.

Marks, $\overset{34\ C}{TL\ EN}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | ..... | |
| 10,000 | .0011 | .0007 | ..... | |
| 20,000 | .0024 | .0013 | ..... | |
| 30,000 | .0040 | .0016 | 0. | |
| 40,000 | .0051 | .0011 | .0001 | |
| 48,000 | ..... | ..... | ..... | Elastic limit (approximate). |
| 50,000 | .0070 | .0019 | .0008 | |
| 51,000 | .0220 | .0150 | ..... | |
| 52,000 | .0360 | .0140 | ..... | |
| 54,000 | .0400 | .0040 | ..... | |
| 56,000 | .0470 | .0070 | ..... | |
| 60,000 | .0650 | .0080 | ..... | |
| 65,000 | .09 | .0250 | ..... | |
| 70,000 | .13 | .04 | ..... | |
| 80,000 | .22 | .09 | ..... | |
| 85,920 | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 85,920 |
| Elastic limit per square inch of original section (approximate) | do... | 48,000 |
| Elongation after rupture | inch.. | .70 |
| Reduction in diameter at point of rupture | do... | .184 |
| Reduction in area after rupture, per cent of original section | | 41.9 |
| Position of rupture | | 1".25 from neck |
| Character of broken surface | | silky oblique; opened minute cracks in surface of stem |

## No. 7099.

Marks, $\overset{.34\ C}{TL\ EN}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0005 | .0005 | 0. | |
| 10,000 | .0011 | .0006 | ..... | |
| 20,000 | .0022 | .0011 | ..... | |
| 30,000 | .0037 | .0015 | 0. | |
| 40,000 | .0054 | .0017 | .0003 | |
| 42,000 | .0060 | .0006 | ..... | |
| 44,000 | .0068 | .0008 | ..... | Elastic limit, approximate. |
| 48,000 | .0083 | .0015 | ..... | |
| 50,000 | .0100 | .0017 | .0034 | |
| 52,000 | .0118 | .0018 | ..... | |
| 54,000 | .0152 | .0034 | ..... | |
| 56,000 | .0195 | .0043 | ..... | |
| 60,000 | .0283 | .0088 | ..... | |
| 70,000 | .06 | .0317 | ..... | |
| 80,000 | .10 | .04 | ..... | |
| 90,000 | .18 | .08 | ..... | |
| 98,400 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 98,400 |
| Elastic limit per square inch of original section (approximate) | do.... | 44,000 |
| Elongation after rupture | inch.. | .52 |
| Elongation under strain at elastic limit | do.... | .0068 |
| Reduction in diameter at point of rupture | do.... | .114 |
| Reduction in area after rupture, per cent of original section | | 36.4 |
| Position of rupture | | ".45 from neck |
| Character of broken surface | | granular, 60 per cent; silky oblique, 40 per cent |

## No. 7053.

Marks, $\frac{.34\ C}{TL\ EP}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0012 | .0008 | ..... | |
| 20,000 | .0026 | .0014 | ..... | |
| 30,000 | .0041 | .0015 | .0002 | |
| 34,000 | ..... | ..... | ..... | Elastic limit, approximate. |
| 40,000 | .0062 | .0021 | .0010 | |
| 42,000 | .0070 | .0008 | ..... | |
| 44,000 | .0077 | .0007 | ..... | |
| 46,000 | .0080 | .0003 | ..... | |
| 48,000 | .0088 | .0008 | ..... | |
| 50,000 | .0096 | .0008 | .0029 | |
| 55,000 | .0115 | .0019 | ..... | |
| 60,000 | .0154 | .0039 | ..... | |
| 65,000 | .0210 | .0056 | ..... | |
| 70,000 | .0290 | .0080 | ..... | |
| 80,000 | .0515 | .0225 | ..... | |
| 90,000 | .08 | .0285 | ..... | |
| 100,000 | .14 | .06 | ..... | |
| 104,400 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 104,400 |
| Elastic limit per square inch of original section (approximate) | do... | 34,000 |
| Elongation after rupture | inch.. | .17 |
| Reduction in diameter at point of rupture | do... | .014 |
| Reduction in area after rupture, per cent of original section | | 5.0 |
| Position of rupture | | 1″.4 from neck |
| Character of broken surface | | granular; opened cracks along surface of stem |

## No. 7100.

Marks, $\frac{.34\ C}{TL\ EP}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0011 | .0007 | ..... | |
| 20,000 | .0024 | .0018 | ..... | |
| 30,000 | .0039 | .0015 | .0001 | |
| 39,000 | ..... | ..... | ..... | Elastic limit, approximate. |
| 40,000 | .0060 | .0021 | .0010 | |
| 42,000 | .0068 | .0008 | ..... | |
| 44,000 | .0071 | .0003 | ..... | |
| 46,000 | .0079 | .0008 | ..... | |
| 48,000 | .0088 | .0009 | ..... | |
| 50,000 | .0092 | .0004 | .0028 | |
| 52,000 | .0100 | .0008 | ..... | |
| 54,000 | .0110 | .0010 | ..... | |
| 56,000 | .0123 | .0013 | ..... | |
| 60,000 | .0159 | .0036 | ..... | |
| 70,000 | .0320 | .0161 | ..... | |
| 80,000 | .06 | .0280 | ..... | |
| 90,000 | .09 | .03 | ..... | |
| 100,000 | .16 | .07 | ..... | |
| 106,880 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 106,880 |
| Elastic limit per square inch of original section (approximate) | do... | 39,000 |
| Elongation after rupture | inch.. | .45 |
| Reduction in diameter at point of rupture | do... | .064 |
| Reduction in area after rupture, per cent of original section | | 21.4 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular, radiating from a point in the circumference; very pronounced cracks opened in the surface of stem. |

## No. 7101.

Hollow specimen.
Marks, $\overset{.84\,C}{TN\ EN}$
Exterior diameter, ″.588.
Interior diameter, ″.300.
Sectional area, .20 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0012 | .0008 | ..... | |
| 20,000 | .0022 | .0010 | ..... | |
| 30,000 | .0036 | .0014 | 0. | |
| 40,000 | .0048 | .0012 | 0. | |
| 50,000 | .0059 | .0011 | 0. | |
| 60,000 | .0071 | .0012 | ..... | Elastic limit. |
| 61,000 | .0530 | .0459 | ..... | |
| 62,000 | .0550 | .0020 | ..... | |
| 64,000 | .0620 | .0070 | ..... | |
| 66,000 | .0710 | .0090 | ..... | |
| 70,000 | .0920 | .0210 | ..... | |
| 75,000 | .12 | .0280 | ..... | |
| 80,000 | .17 | .05 | ..... | |
| 85,000 | .22 | .05 | ..... | |
| 90,000 | .39 | .17 | ..... | |
| 91,000 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 91,000 |
| Elastic limit per square inch of original section | do... | 60,000 |
| Elongation after rupture | inch.. | .67 |
| Elongation under strain at elastic limit | do... | .0071 |
| Reduction in diameter at point of rupture (exterior) | do... | .188 |
| Position of rupture | | 1″.25 from neck |
| Character of broken surface | | silky, minute cracks developed in stem |

The surface of this specimen could be marked with a file, but with difficulty.

## No. 7102.

Hollow specimen.
Marks, $\overset{.34\,C}{TN\ EN}$
Exterior diameter, ".588.
Interior diameter, ".300.
Sectional area, .20 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0005 | .0005 | ..... | |
| 10,000 | .0011 | .0006 | ..... | |
| 20,000 | .0022 | .0011 | ..... | |
| 30,000 | .0037 | .0015 | .0001 | |
| 40,000 | .0052 | .0015 | ..... | |
| 44,000 | .0058 | .0006 | ..... | Elastic limit. |
| 45,000 | .0070 | .0012 | .0017 | |
| 46,000 | .0076 | .0006 | ..... | |
| 47,000 | .0080 | .0004 | ..... | |
| 48,000 | .0082 | .0002 | ..... | |
| 49,000 | .0087 | .0005 | ..... | |
| 50,000 | .0090 | .0003 | .0030 | |
| 52,000 | .0102 | .0012 | ..... | |
| 54,000 | .0115 | .0013 | ..... | |
| 56,000 | .0131 | .0016 | ..... | |
| 60,000 | .0182 | .0051 | ..... | |
| 65,000 | .0250 | .0068 | ..... | |
| 70,000 | .0340 | .0090 | ..... | |
| 80,000 | .06 | .0260 | ..... | |
| 90,000 | .09 | .03 | ..... | |
| 100,000 | .16 | .07 | ..... | |
| 107,000 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 107,000 |
| Elastic limit per square inch of original section | do. . | 44,000 |
| Elongation after rupture | inch .. | .30 |
| Elongation under strain at elastic limit | do... | .0058 |
| Reduction in diameter at point of rupture (exterior) | do... | .068 |
| Position of rupture | | ".4 from neck |
| Character of broken surface | | granular |

## No. 7103.

Hollow specimen.
Marks, $\frac{.34\ C}{TN\ EP}$
Exterior diameter, ".588.
Interior diameter, ".300.
Sectional area, .20 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0011 | .0007 | ..... | |
| 20,000 | .0023 | .0012 | ..... | |
| 30,000 | .0038 | .0015 | .0001 | |
| 38,000 | ..... | ..... | ..... | Elastic limit (approximate). |
| 40,000 | .0059 | .0021 | .0010 | |
| 41,000 | .0062 | .0003 | ..... | |
| 42,000 | .0065 | .0003 | ..... | |
| 43,000 | .0068 | .0003 | ..... | |
| 44,000 | .0071 | .0003 | .0018 | |
| 46,000 | .0079 | .0008 | ..... | |
| 50,000 | .0092 | .0013 | ..... | |
| 55,000 | .0116 | .0024 | ..... | |
| 60,000 | .0145 | .0029 | ..... | |
| 65,000 | .0182 | .0037 | ..... | |
| 70,000 | .0243 | .0061 | ..... | |
| 80,000 | .04 | .0157 | ..... | |
| 90,000 | .07 | .03 | ..... | |
| 100,000 | .11 | .04 | ..... | |
| 110,000 | .18 | .07 | ..... | |
| 111,000 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 111,000 |
| Elastic limit per square inch of original section (approximate) | do... | 38,000 |
| Elongation after rupture | inch.. | .18 |
| Reduction in diameter at point of rupture (exterior) | do... | .028 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular; opened minute cracks in surface of stem |

## No. 7104.

Hollow specimen.
Marks, $\frac{34\ C}{TN\ EP}$
Exterior diameter, ".588.
Interior diameter, ".300.
Sectional area, .20 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0002 | .0002 | 0. | |
| 10,000 | .0009 | .0007 | ..... | |
| 20,000 | .0021 | .0012 | ..... | |
| 30,000 | .0037 | .0016 | 0. | |
| 39,000 | .0051 | .0014 | ..... | Elastic limit. |
| 40,000 | .0059 | .0008 | .0009 | |
| 42,000 | .0065 | .0006 | ..... | |
| 44,000 | .0070 | .0005 | ..... | |
| 46,000 | .0076 | .0006 | ..... | |
| 48,000 | .0082 | .0006 | ..... | |
| 50,000 | .0090 | .0008 | .0027 | |
| 55,000 | .0112 | .0022 | ..... | |
| 60,000 | .0140 | .0028 | ..... | |
| 65,000 | .0172 | .0032 | ..... | |
| 70,000 | .0225 | .0053 | ..... | |
| 100,000 | .09 | .0675 | ..... | |
| 102,000 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 102,000 |
| Elastic limit per square inch of original section | do... | 39,000 |
| Elongation after rupture | inch.. | .09 |
| Elongation under strain at elastic limit | do... | .0051 |
| Reduction in diameter at point of rupture (exterior) | do... | .008 |
| Position of rupture | | ".5 from neck |
| Character of broken surface | | granular; opened minute cracks in surface of stem |

## No. 7105.

Hollow specimen.
Marks, $\overset{34\ C.}{TL\ EN}$
Exterior diameter, ".588.
Interior diameter, ".300.
Sectional area, .20 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0005 | .0005 | 0. | |
| 10,000 | .0012 | .0007 | ..... | |
| 20,000 | .0025 | .0013 | ..... | |
| 30,000 | .0041 | .0016 | .0003 | |
| 38,000 | .0051 | .0010 | ..... | Elastic limit. |
| 39,000 | .0057 | .0006 | ..... | |
| 40,000 | .0062 | .0005 | .0011 | |
| 42,000 | .0068 | .0006 | ..... | |
| 44,000 | .0072 | .0004 | ..... | |
| 46,000 | .0080 | .0008 | ..... | |
| 50,000 | .0091 | .0011 | .0034 | |
| 55,000 | .0110 | .0019 | ..... | |
| 60,000 | .0131 | .0021 | ..... | |
| 65,000 | .0161 | .0030 | ..... | |
| 70,000 | .0200 | .0039 | ..... | |
| 80,000 | .03 | .01 | ..... | |
| 90,000 | .05 | 02 | ..... | |
| 100,000 | .07 | .02 | ..... | |
| 107,250 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 107,250 |
| Elastic limit per square inch of original section | do... | 38,000 |
| Elongation after rupture | inch.. | .09 |
| Elongation under strain at elastic limit | do... | .0051 |
| Reduction in diameter at point of rupture (exterior) | do... | .008 |
| Position of rupture | | 1".1 from neck |
| Character of broken surface | | granular; opened minute cracks in surface of stem |

## No. 7106.

Hollow specimen.
Marks, $\overset{.34\ C}{TL\ EN}$
Exterior diameter, ".588.
Interior diameter, ".300.
Sectional area, .20 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0005 | .0005 | 0. | |
| 10,000 | .0011 | .0006 | ..... | |
| 20,000 | .0021 | .0010 | ..... | |
| 30,000 | .0035 | .0014 | .0001 | |
| 38,000 | ..... | ..... | ..... | Elastic limit (approximate). |
| 40,000 | .0053 | .0018 | .0009 | |
| 42,000 | .0060 | .0007 | ..... | |
| 44,000 | .0066 | .0006 | ..... | |
| 46,000 | .0071 | .0005 | ..... | |
| 48,000 | .0080 | .0009 | ..... | |
| 50,000 | .0087 | .0007 | .0027 | |
| 55,000 | .0108 | .0021 | ..... | |
| 60,000 | .0138 | .0030 | ..... | |
| 65,000 | .0178 | .0040 | ..... | |
| 70,000 | .0230 | .0052 | ..... | |
| 80,000 | .04 | .0170 | ..... | |
| 90,000 | .07 | .03 | ..... | |
| 100,000 | .11 | .04 | ..... | |
| 109,900 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 109,900 |
| Elastic limit per square inch of original section (approximate) | do... | 38,000 |
| Elongation after rupture | inch.. | .19 |
| Reduction in diameter at point of rupture (exterior) | do... | .018 |
| Position of rupture | | 1".2 from neck |
| Character of broken surface | | granular; opened minute cracks in surface of stem |

## No. 7107.

Hollow specimen.
Marks, $\frac{34\ C}{TL\ EP}$
Exterior diameter, ″.588.
Interior diameter, ″.300.
Sectional area, .20 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0007 | .0007 | 0. | |
| 10,000 | .0012 | .0005 | ..... | |
| 20,000 | .0027 | .0015 | ..... | Snapping sounds. |
| 30,000 | .0041 | .0014 | .0008 | |
| 38,000 | ..... | ..... | ..... | Elastic limit (approximate). |
| 40,000 | .0063 | .0022 | .0012 | |
| 42,000 | .0070 | .0007 | ..... | |
| 44,000 | .0075 | .0005 | ..... | |
| 46,000 | .0080 | .0005 | ..... | |
| 48,000 | .0088 | .0008 | ..... | |
| 50,000 | .0092 | .0004 | .0030 | |
| 55,000 | .0110 | .0018 | ..... | |
| 60,000 | .0140 | .0030 | ..... | |
| 70,000 | .0220 | .0080 | ..... | |
| 80,000 | .04 | .0180 | ..... | |
| 90,000 | .06 | .02 | ..... | |
| 100,000 | .09 | .03 | ..... | |
| 109,950 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 109,950 |
| Elastic limit per square inch of original section (approximate) | do... | 38,000 |
| Elongation after rupture | inch.. | .15 |
| Reduction in diameter at point of rupture (exterior) | do... | .018 |
| Position of rupture | | ″.50 from neck |
| Character of broken surface | | granular; opened minute cracks in surface of stem |

## No. 7108.

Hollow specimen.
Marks, $\overset{.34\ C}{TL\ EP}$
Exterior diameter, ".588.
Interior diameter, ".300.
Sectional area, .20 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0005 | .0005 | 0. | |
| 10,000 | .0011 | .0006 | ..... | |
| 20,000 | .0022 | .0011 | ..... | |
| 30,000 | .0040 | .0018 | .0005 | |
| 38,000 | ..... | ..... | ..... | Elastic limit (approximate). |
| 40,000 | .0060 | .0020 | .0011 | |
| 42,000 | .0063 | .0003 | ..... | |
| 44,000 | .0070 | .0007 | ..... | |
| 46,000 | .0074 | .0004 | ..... | |
| 48,000 | .0080 | .0006 | ..... | |
| 50,000 | .0086 | .0006 | .0021 | |
| 55,000 | .0100 | .0014 | ..... | |
| 60,000 | .0118 | .0018 | ..... | |
| 65,000 | .0140 | .0022 | ..... | |
| 70,000 | .0166 | .0026 | ..... | |
| 80,000 | .03 | .0134 | ..... | |
| 90,000 | .04 | .01 | ..... | |
| 100,000 | .05 | .01 | ..... | |
| 104,500 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 104,500 |
| Elastic limit per square inch of original section (approximate) | do... | 38,000 |
| Elongation per inch after rupture | inch.. | .05 |
| Reduction in diameter at point of rupture (exterior) | do... | .008 |
| Position of rupture | | at the neck |
| Character of broken surface | | granular |

## No. 7068.

**Steel in natural state, from hot rolled bar.**
**Marks, .55 C.**
**Diameter, ".564.**
**Sectional area, .25 square inch.**
**Gauged length on heads, 4".**

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0011 | .0007 | ..... | |
| 20,000 | .0025 | .0014 | ..... | |
| 30,000 | .0040 | .0015 | ..... | |
| 40,000 | .0051 | .0011 | 0. | |
| 50,000 | .0066 | .0015 | ..... | |
| 58,000 | .0078 | .0012 | ..... | |
| 59,000 | .0079 | .0001 | ..... | Elastic limit. |
| 60,000 | .0263 | .0184 | ..... | |
| 61,000 | .0300 | .0037 | ..... | |
| 62,000 | .0320 | .0020 | ..... | |
| 64,000 | .0360 | .0040 | ..... | |
| 66,000 | .0404 | .0044 | ..... | |
| | .0420 | .0016 | ..... | Rested 1 hour under load. |
| 68,000 | .0433 | .0013 | ..... | |
| 70,000 | .0483 | .0050 | ..... | |
| 72,000 | .0550 | .0067 | ..... | |
| 75,000 | .07 | .0150 | ..... | |
| 80,000 | .08 | .01 | ..... | |
| 85,000 | .10 | .02 | ..... | |
| 90,000 | .12 | .02 | ..... | |
| 100,000 | .18 | .06 | ..... | |
| 109,920 | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 109,920 |
| Elastic limit per square inch of original section | do... | 59,000 |
| Elongation after rupture | inch.. | .55 |
| Elongation under strain at elastic limit | do... | .0079 |
| Reduction in diameter at point of rupture | do... | .104 |
| Reduction in area after rupture, per cent of original section | | 83.5 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky, interspersed with fine granulation |
| Elongation of inch sections on stem | | ".13, ".28*, ".12 |

## No. 7069.

Steel in natural state from hot-rolled bar.
Marks, .55 C.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0005 | .0005 | 0. | |
| 10,000 | .0011 | .0006 | ..... | |
| 20,000 | .0026 | .0015 | ..... | |
| 30,000 | .0040 | .0014 | ..... | |
| 40,000 | .0052 | .0012 | 0. | |
| 50,000 | .0065 | .0013 | ..... | |
| 58,000 | .0078 | .0013 | ..... | Elastic limit. |
| 59,000 | .0290 | .0012 | ..... | |
| 60,000 | .0298 | .0008 | ..... | |
| 61,000 | .0304 | .0006 | ..... | |
| 62,000 | .0320 | .0016 | ..... | |
| 65,000 | .0375 | .0055 | ..... | |
| 70,000 | .0495 | .0120 | ..... | |
| 75,000 | .07 | .0205 | ..... | |
| 80,000 | .09 | .02 | ..... | |
| 90,000 | .12 | .03 | ..... | |
| 100,000 | .18 | .06 | ..... | |
| 109,640 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 109,640 |
| Elastic limit per square inch of original section | do... | 58,000 |
| Elongation after rupture | inch.. | .55 |
| Elongation under strain at elastic limit | do... | .0078 |
| Reduction in diameter at point of rupture | do... | .104 |
| Reduction in area after rupture, per cent of original section | | 83.5 |
| Position of rupture | | 1″.4 from neck |
| Character of broken surface | | silky, interspersed with fine granulation |
| Elongation of inch sections on stem | | ″.16, ″.25*, ″.12 |

## No. 7070.

Steel in natural state from hot-rolled bar.
Marks, .55 C.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0008 | .0008 | 0. | |
| 10,000 | .0010 | .0007 | ..... | |
| 20,000 | .0022 | .0012 | ..... | |
| 30,000 | .0038 | .0016 | ..... | |
| 40,000 | .0050 | .0012 | 0. | |
| 50,000 | .0062 | .0012 | ..... | |
| 58,000 | .0073 | .0011 | ..... | Elastic limit. |
| 59,000 | .0265 | .0192 | ..... | |
| 60,000 | .0281 | .0016 | ..... | |
| 62,000 | .0311 | .0030 | ..... | |
| 65,000 | .0372 | .0061 | ..... | |
| 70,000 | .0493 | .0121 | ..... | |
| 75,000 | .07 | .0207 | ..... | |
| 80,000 | .09 | .02 | ..... | |
| 90,000 | .12 | .03 | ..... | |
| 100,000 | .18 | .06 | ..... | |
| 109,680 | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 109,680 |
| Elastic limit per square inch of original section | do... | 58,000 |
| Elongation after rupture | inch.. | .55 |
| Elongation under strain at elastic limit | do... | .0073 |
| Reduction in diameter at point of rupture | do... | .104 |
| Reduction in area after rupture, per cent of original section | | 33.5 |
| Position of rupture | | 1″.5 from neck |
| Character of broken surface | | silky, interspersed with fine granulation |
| Elongation of inch sections on stem | | ″.14, ″.28*, ″.11 |

## No. 7109.

Marks, $\overset{.55\ C}{TN\ EN}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0013 | .0009 | ..... | |
| 20,000 | .0026 | .0013 | ..... | |
| 30,000 | .0040 | .0014 | ..... | |
| 40,000 | .0055 | .0015 | .0001 | |
| 50,000 | .0071 | .0016 | ..... | |
| 60,000 | .0085 | .0014 | ..... | |
| 70,000 | .0100 | .0015 | ..... | |
| 77,000 | ..... | ..... | ..... | Elastic limit (approximate). |
| 80,000 | .0127 | .0027 | .0018 | |
| 90,000 | .0188 | .0061 | ..... | |
| 100,000 | .0808 | .0120 | ..... | |
| 110,000 | .05 | .0192 | ..... | |
| 120,000 | .08 | .08 | ..... | |
| 127,600 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 127,600 |
| Elastic limit per square inch of original section (approximate) | do... | 77,000 |
| Elongation after rupture | inch.. | .09 |
| Reduction in diameter at point of rupture | do... | .014 |
| Reduction in area after rupture, per cent of original section | | 5.0 |
| Position of rupture | | 1" from neck |
| Character of broken surface | | granular |

## No. 7110.

Marks, $\overset{.55\ C}{TN\ EN}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0013 | .0009 | ..... | |
| 20,000 | .0025 | .0012 | ..... | |
| 30,000 | .0037 | .0012 | ..... | |
| 40,000 | .0051 | .0014 | .0001 | |
| 50,000 | .0066 | .0015 | ..... | |
| 60,000 | .0085 | .0019 | ..... | |
| 67,000 | ..... | ..... | ..... | Elastic limit (approximate). |
| 70,000 | .0109 | .0024 | ..... | |
| 80,000 | .0190 | .0081 | .0078 | |
| 90,000 | .08 | .0110 | ..... | |
| 100,000 | .05 | .02 | ..... | |
| 110,000 | .07 | .02 | ..... | |
| 120,000 | .11 | .04 | ..... | |
| 125,200 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 125,200 |
| Elastic limit per square inch of original section (approximate) | do... | 67,000 |
| Elongation after rupture | inch.. | .18 |
| Reduction in diameter at point of rupture | do... | .014 |
| Reduction in area after rupture, per cent of original section | | 5.0 |
| Position of rupture | | 1" from neck |
| Character of broken surface | | granular |

## No. 7071.

Steel in natural state, from hot rolled bar.
Marks, .73 C.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged lengths on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0008 | .0008 | 0. | |
| 10,000 | .0010 | .0007 | ..... | |
| 20,000 | .0022 | .0012 | ..... | |
| 30,000 | .0037 | .0015 | ..... | |
| 40,000 | .0050 | .0013 | ..... | |
| 50,000 | .0062 | .0012 | 0. | |
| 60,000 | .0075 | .0013 | ..... | |
| 69,000 | .0089 | .0014 | ..... | Elastic limit. |
| 70,000 | .0096 | .0007 | .0006 | |
| 71,000 | .0101 | .0005 | ..... | |
| 72,000 | .0110 | .0009 | ..... | |
| 73,000 | .0116 | .0006 | ..... | |
| 74,000 | .0126 | .0010 | ..... | |
| 76,000 | .0141 | .0015 | ..... | |
| 80,000 | .0182 | .0041 | ..... | |
| 90,000 | .0314 | .0132 | ..... | |
| 100,000 | .0470 | .0156 | ..... | |
| 110,000 | .07 | .0230 | ..... | |
| 120,000 | .09 | .02 | ..... | |
| 130,000 | .12 | .03 | ..... | |
| 140,000 | .18 | .06 | ..... | |
| 146,800 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of orignal section | pounds.. | 146,800 |
| Elastic limit per square inch of original section | do... | 69,000 |
| Elongation after rupture | inch.. | .21 |
| Elongation under strain at elastic limit | do... | .0069 |
| Reduction in diameter at point of rupture | do... | .014 |
| Reduction in area after rupture, per cent of original section | | 5.0 |
| Position of rupture | | ″.6 from neck |
| Character of broken surface | | fine granular |
| Elongation of inch sections on stem | | ″.06, ″.07, ″.07* |

## No. 7072.

Steel in natural state, from hot rolled bar.
Marks, .73 C.
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0011 | .0007 | ..... | |
| 20,000 | .0024 | .0013 | ..... | |
| 30,000 | .0038 | .0014 | ..... | |
| 40,000 | .0051 | .0013 | ..... | |
| 50,000 | .0062 | .0011 | 0. | |
| 60,000 | .0077 | .0015 | ..... | |
| 68,000 | .0090 | .0013 | ..... | |
| 69,000 | .0092 | .0002 | ..... | Elastic limit. |
| 70,000 | .0102 | .0010 | ..... | |
| 71,000 | .0108 | .0006 | ..... | |
| 72,000 | .0112 | .0004 | ..... | |
| 73,000 | .0121 | .0009 | ..... | |
| 74,000 | .0130 | .0009 | ..... | |
| 76,000 | .0147 | .0017 | ..... | |
| 80,000 | .0191 | .0044 | ..... | |
| 90,000 | .0320 | .0129 | ..... | |
| 100,000 | .0482 | .0162 | ..... | |
| 110,000 | .07 | .0218 | ..... | |
| 120,000 | .10 | .03 | ..... | |
| 130,000 | .13 | .03 | ..... | |
| 140,000 | .18 | .05 | ..... | |
| 142,440 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 142,440 |
| Elastic limit per square inch of original section | do... | 69,000 |
| Elongation after rupture | inch.. | .16 |
| Elongation under strain at elastic limit | do... | .0092 |
| Reduction in diameter at point of rupture | do... | .014 |
| Reduction in area after rupture, per cent of original section | | 5.0 |
| Position of rupture | | ".7 from neck |
| Character of broken surface | | fine granular |
| Elongation of inch sections on stem | | ".06*, ".05, ".04 |

## No. 7117.

Steel in natural state from hot rolled bar, annealed in ashes.
Marks, .73 C.
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0006 | .0006 | 0. | |
| 10,000 | .0011 | .0005 | ..... | |
| 20,000 | .0027 | .0016 | ..... | |
| 30,000 | .0039 | .0012 | 0. | |
| 40,000 | .0052 | .0013 | ..... | |
| 50,000 | .0067 | .0015 | .0001 | |
| 60,000 | .0080 | .0013 | .0001 | |
| 69,000 | .0092 | .0012 | ..... | Elastic limit. |
| 70,000 | .0100 | .0008 | .0009 | |
| 71,000 | .0109 | .0009 | ..... | |
| 72,000 | .0117 | .0008 | ..... | |
| 74,000 | .0130 | .0013 | ..... | |
| 76,000 | .0153 | .0023 | ..... | |
| 80,000 | .0200 | .0047 | ..... | |
| 90,000 | .04 | .02 | ..... | |
| 100,000 | .05 | .01 | ..... | |
| 110,000 | .07 | .02 | ..... | |
| 120,000 | .10 | .03 | ..... | |
| 130,000 | .13 | .03 | ..... | |
| 133,120 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 133,120 |
| Elastic limit per square inch of original section | do... | 69,000 |
| Elongation after rupture | inch.. | .12 |
| Elongation under strain at elastic limit | do... | .0092 |
| Reduction in diameter at point of rupture | do... | .014 |
| Reduction in area after rupture, per cent of original section | | 5.0 |
| Position of rupture | | ".8 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections on stem | | ".03, ".04, ".04* |

## No. 7111.

Marks, $\overset{.73\ C}{TN\ EN}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0005 | .0005 | 0. | |
| 10,000 | .0011 | .0006 | ..... | |
| 20,000 | .0023 | .0012 | ..... | |
| 30,000 | .0038 | .0015 | 0. | |
| 40,000 | .0050 | .0012 | ..... | |
| 50,000 | .0065 | .0015 | .0001 | |
| 58,000 | ..... | ..... | ..... | Elastic limit (approximate). |
| 59,000 | .0081 | .0016 | ..... | |
| 60,000 | .0092 | .0011 | .0015 | |
| 61,000 | .0099 | .0007 | ..... | |
| 62,000 | .0102 | .0003 | ..... | |
| 63,000 | .0107 | .0005 | ..... | |
| 64,000 | .0111 | .0004 | ..... | |
| 66,000 | .0127 | .0016 | ..... | |
| 70,000 | .0160 | .0033 | ..... | |
| 75,000 | .0205 | .0045 | ..... | |
| 80,000 | .0270 | .0065 | ..... | |
| 90,000 | .05 | .0230 | ..... | |
| 99,760 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 99,760 |
| Elastic limit per square inch of original section (approximate) | do... | 58,000 |
| Elongation after rupture | inch.. | .07 |
| Reduction in diameter at point of rupture | do... | .014 |
| Reduction in area after rupture, per cent of original section | | 5.0 |
| Position of rupture | | ″.6 from neck |
| Character of broken surface | | granular |

## No. 7112.

Marks, $\overset{.73\ C}{TN\ EN}$.
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0003 | .0003 | 0. | |
| 10,000 | .0010 | .0007 | ..... | |
| 20,000 | .0021 | .0011 | ..... | |
| 30,000 | .0036 | .0015 | 0. | |
| 40,000 | .0050 | .0014 | ..... | |
| 50,000 | .0061 | .0011 | 0. | |
| 60,000 | .0077 | .0016 | .0001 | |
| 62,000 | .0080 | .0003 | ..... | Elastic limit. |
| 63,000 | .0086 | .0006 | ..... | |
| 64,000 | .0097 | .0011 | ..... | |
| 65,000 | .0108 | .0011 | ..... | |
| 66,000 | .0120 | .0012 | ..... | |
| 68,000 | .0148 | .0028 | ..... | |
| 70,000 | .0175 | .0027 | ..... | |
| 80,000 | .03 | .0125 | ..... | |
| 90,000 | .05 | .02 | ..... | |
| 100,000 | .07 | .02 | ..... | |
| 110,000 | .10 | .03 | ..... | |
| 116,080 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 116,080 |
| Elastic limit per square inch of original section | do... | 62,000 |
| Elongation after rupture | inch.. | .11 |
| Elongation under strain at elastic limit | do... | .0080 |
| Reduction in diameter at point of rupture | do... | .014 |
| Reduction in area after rupture, per cent of original section | | 5.0 |
| Position of rupture | | ".55 from neck |
| Character of broken surface | | granular |

## No. 7073.

Steel in natural state, from hot rolled bar.
Marks, .82 C.
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0010 | .0006 | ..... | |
| 20,000 | .0022 | .0012 | ..... | |
| 30,000 | .0036 | .0014 | ..... | |
| 40,000 | .0049 | .0013 | ..... | |
| 50,000 | .0061 | .0012 | 0. | |
| 60,000 | .0076 | .0015 | ..... | |
| 64,000 | .0081 | .0005 | ..... | |
| 65,000 | .0083 | .0002 | ..... | Elastic limit. |
| 66,000 | .0109 | .0026 | ..... | |
| 67,000 | .0121 | .0012 | ..... | |
| 68,000 | .0132 | .0011 | ..... | |
| 70,000 | .0156 | .0014 | ..... | |
| 75,000 | .0214 | .0058 | ..... | |
| 80,000 | .0270 | .0056 | ..... | |
| 90,000 | .05 | .0230 | ..... | |
| 100,000 | .07 | .02 | ..... | |
| 110,000 | .09 | .02 | ..... | |
| 120,000 | .11 | .02 | ..... | |
| 130,000 | .14 | .03 | ..... | |
| 140,000 | .22 | .08 | ..... | |
| 143,200 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 143,200 |
| Elastic limit per square inch of original section | do... | 65,000 |
| Elongation after rupture | inch.. | .27 |
| Elongation under strain at elastic limit | do... | .0083 |
| Reduction in diameter at point of rupture | do... | .034 |
| Reduction in area after rupture, per cent of original section | | 11.8 |
| Position of rupture | | ".85 from neck |
| Character of broken surface | | fine granular |
| Elongation of inch sections on stem | | ".07, ".08, ".11* |

## No. 7074.

Steel in natural state, from hot rolled bar.
Marks, .82 C.
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0005 | .0005 | 0. | |
| 10,000 | .0012 | .0007 | ..... | |
| 20,000 | .0027 | .0015 | ..... | |
| 30,000 | .0041 | .0014 | ..... | |
| 40,000 | .0056 | .0015 | ..... | |
| 50,000 | .0070 | .0014 | 0. | |
| 60,000 | .0082 | .0012 | ..... | |
| 63,000 | .0086 | .0004 | ..... | Elastic limit. |
| 64,000 | .0092 | .0006 | ..... | |
| 65,000 | .0099 | .0007 | ..... | |
| 66,000 | .0113 | .0014 | ..... | |
| 68,000 | .0140 | .0027 | ..... | |
| 70,000 | .0163 | .0023 | ..... | |
| 75,000 | .0202 | .0039 | ..... | |
| 80,000 | .0275 | .0073 | ..... | |
| 90,000 | .05 | .0225 | ..... | |
| 100,000 | .07 | .02 | ..... | |
| 110,000 | .09 | .02 | ..... | |
| 120,000 | .10 | .01 | ..... | |
| 130,000 | .14 | .04 | ..... | |
| 140,000 | .20 | .06 | ..... | |
| 144,400 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 144,400 |
| Elastic limit per square inch of original section | do... | 63,000 |
| Elongation after rupture | inch.. | .29 |
| Elongation under strain at elastic limit | do... | .0086 |
| Reduction in diameter at point of rupture | do... | .034 |
| Reduction in area after rupture, per cent of original section | | 11.8 |
| Position of rupture | | 1".1 from neck |
| Character of broken surface | | fine granular |
| Elongation of inch sections on stem | | ".10*, ".11*, ".07 |

## No. 7118.

Steel in natural state, from hot rolled bar, annealed in ashes.
Marks, .82 C.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0002 | .0002 | 0. | |
| 10,000 | .0010 | .0008 | ..... | |
| 20,000 | .0023 | .0013 | ..... | |
| 30,000 | .0038 | .0015 | ..... | |
| 40,000 | .0050 | .0012 | ..... | |
| 50,000 | .0062 | .0012 | 0. | |
| 60,000 | .0076 | .0014 | 0. | |
| 68,000 | .0091 | .0015 | ..... | |
| 69,000 | .0093 | .0002 | ..... | Elastic limit. |
| 70,000 | .0104 | .0011 | .0008 | |
| 71,000 | .0112 | .0008 | ..... | |
| 72,000 | .0121 | .0009 | ..... | |
| 74,000 | .0143 | .0022 | ..... | |
| 76,000 | .0170 | .0027 | ..... | |
| 80,000 | .0220 | .0050 | ..... | |
| 90,000 | .04 | .0180 | ..... | |
| 100,000 | .05 | .01 | ..... | |
| 110,000 | .07 | .02 | ..... | |
| 120,000 | .10 | .03 | ..... | |
| 130,000 | .13 | .03 | ..... | |
| 137,640 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 137,640 |
| Elastic limit per square inch of original section | do... | 69,000 |
| Elongation after rupture | inch.. | .14 |
| Elongation under strain at elastic limit | do... | .0093 |
| Reduction in diameter at point of rupture | do... | .014 |
| Reduction in area after rupture, per cent of original section | | 5.0 |
| Position of rupture | | 1″.04 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections on stem | | ″.04*, ″.05*, ″.04 |

## No. 7113.

Marks, $\overset{.82\ C}{TN\ EN}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0006 | .0006 | 0. | |
| 10,000 | .0013 | .0007 | ..... | |
| 20,000 | .0028 | .0015 | ..... | |
| 30,000 | .0041 | .0013 | 0. | |
| 40,000 | .0055 | .0014 | ..... | |
| 50,000 | .0070 | .0015 | .0001 | |
| 58,000 | ..... | ..... | ..... | Elastic limit (approximate). |
| 60,000 | .0092 | .0022 | .0010 | |
| 62,000 | .0099 | .0007 | ..... | |
| 64,000 | .0107 | .0008 | ..... | |
| 66,000 | .0112 | .0005 | ..... | |
| 68,000 | .0121 | .0009 | ..... | |
| 70,000 | .0132 | .0011 | .0035 | |
| 75,000 | .0163 | .0031 | ..... | |
| 80,000 | .0219 | .0056 | ..... | |
| 90,000 | .04 | .0181 | ..... | |
| 100,000 | .05 | .01 | ..... | |
| 106,880 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 106,880 |
| Elastic limit per square inch of original section (approximate) | do... | 58,000 |
| Elongation after rupture | inch.. | .05 |
| Reduction in diameter at point of rupture | do... | .014 |
| Reduction in area after rupture, per cent of original section | | 5.0 |
| Position of rupture | | at the neck |
| Character of broken surface | | granular |

## No. 7114.

Marks, $\overset{.82\ C}{TN\ EN}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length on heads, 4".

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0006 | .0006 | 0. | |
| 10,000 | .0011 | .0005 | ..... | |
| 20,000 | .0022 | .0011 | ..... | |
| 30,000 | .0037 | .0015 | 0. | |
| 40,000 | .0050 | .0013 | ..... | |
| 50,000 | .0062 | .0012 | 0. | |
| 54,000 | .0070 | .0008 | ..... | Elastic limit. |
| 56,000 | .0080 | .0010 | ..... | |
| 58,000 | .0111 | .0031 | ..... | |
| 60,000 | .0132 | .0021 | .0050 | |
| 62,000 | .0150 | .0018 | ..... | |
| 64,000 | .0172 | .0022 | ..... | |
| 66,000 | .0200 | .0028 | ..... | |
| 70,000 | .0250 | .0050 | ..... | |
| 80,000 | .04 | .0150 | ..... | |
| 90,000 | .06 | .02 | ..... | |
| 119,200 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 119,200 |
| Elastic limit per square inch of original section | do... | 54,000 |
| Elongation after rupture | inch.. | .07 |
| Elongation under strain at elastic limit | do... | .0070 |
| Reduction in diameter at point of rupture | do... | .014 |
| Reduction in area after rupture, per cent of original section | | 5.0 |
| Position of rupture | | at the neck |
| Character of broken surface | | granular |

## No. 7075.

Steel in natural state, from hot rolled bar.
Marks, 1.09 C.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0005 | .0005 | 0. | |
| 10,000 | .0011 | .0006 | ..... | |
| 20,000 | .0025 | .0014 | ..... | |
| 30,000 | .0039 | .0014 | ..... | |
| 40,000 | .0052 | .0013 | ..... | |
| 50,000 | .0066 | .0014 | 0. | |
| 60,000 | .0079 | .0013 | ..... | |
| 70,000 | .0098 | .0019 | ..... | |
| 72,000 | .0102 | .0004 | ..... | Elastic limit. |
| 73,000 | .0280 | .0178 | ..... | |
| 74,000 | .0290 | .0010 | ..... | |
| 76,000 | .0310 | .0020 | ..... | |
| 80,000 | .0360 | .0050 | ..... | |
| 90,000 | .06 | .0240 | ..... | |
| 100,000 | .07 | .01 | ..... | |
| 110,000 | .09 | .02 | ..... | |
| 120,000 | .12 | .03 | ..... | |
| 129,600 | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 129,600 |
| Elastic limit per square inch of original section | do... | 72,000 |
| Elongation after rupture | inch.. | .12 |
| Elongation under strain at elastic limit | do... | .0102 |
| Reduction in diameter at point of rupture | do... | .014 |
| Reduction in area after rupture, per cent of original section | | 5.0 |
| Position of rupture | | ″.45 from neck |
| Character of broken surface | | fine granular |
| Elongation of inch sections on stem | | ″.05*, ″.03, ″.03 |

## No. 7076.

Steel in natural state, from hot rolled bar.
Marks, 1.09 C.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0005 | .0005 | 0. | |
| 10,000 | .0011 | .0006 | ..... | |
| 20,000 | .0026 | .0015 | ..... | |
| 30,000 | .0039 | .0013 | ..... | |
| 40,000 | .0052 | .0013 | ..... | |
| 50,000 | .0066 | .0014 | 0. | |
| 60,000 | .0079 | .0013 | ..... | |
| 70,000 | .0095 | .0016 | ..... | |
| 72,000 | .0098 | .0003 | ..... | Elastic limit. |
| 73,000 | .0300 | .0202 | ..... | |
| 74,000 | .0306 | .0006 | ..... | |
| 75,000 | .0314 | .0008 | ..... | |
| 76,000 | .0320 | .0006 | ..... | |
| 80,000 | .0370 | .0050 | ..... | |
| 90,000 | .06 | .0230 | ..... | |
| 100,000 | .08 | .02 | ..... | |
| 110,000 | .09 | .01 | ..... | |
| 120,000 | .12 | .03 | ..... | |
| 126,800 | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 126,800 |
| Elastic limit per square inch of original section | do... | 72,000 |
| Elongation after rupture | inch.. | .10 |
| Elongation under strain at elastic limit | do... | .0098 |
| Reduction in diameter at point of rupture | do... | .014 |
| Reduction in area after rupture, per cent of original section | | 5.0 |
| Position of rupture | | ″.35 from neck |
| Character of broken surface | | fine granular |
| Elongation of inch sections on stem | | ″.03, ″.04, ″.03* |

## No. 7119.

Steel in natural state, from hot rolled bar, annealed in ashes.
Marks, 1.09 C.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0005 | .0005 | 0. | |
| 10,000 | .0012 | .0007 | ..... | |
| 20,000 | .0025 | .0013 | ..... | |
| 30,000 | .0039 | .0014 | ..... | |
| 40,000 | .0050 | .0011 | ..... | |
| 50,000 | .0064 | .0014 | 0. | |
| 60,000 | .0079 | .0015 | ..... | |
| 70,000 | .0090 | .0011 | 0. | |
| 73,000 | .0096 | .0006 | ..... | |
| 74,000 | .0098 | .0002 | ..... | Elastic limit. |
| 75,000 | .0350 | .0252 | ..... | |
| 76,000 | .0361 | .0011 | ..... | |
| 78,000 | .0372 | .0011 | ..... | |
| 80,000 | .0400 | .0028 | ..... | |
| 90,000 | .06 | .02 | ..... | |
| 100,000 | .08 | .02 | ..... | |
| 110,000 | .10 | .02 | ..... | |
| 118,400 | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 118,400 |
| Elastic limit per square inch of original section | do... | 74,000 |
| Elongation after rupture | inch.. | .09 |
| Elongation under strain at elastic limit | do... | .0098 |
| Reduction in diameter at point of rupture | do... | .014 |
| Reduction in area after rupture, per cent of original section | | 5.0 |
| Position of rupture | | ″.15 from neck |
| Character of broken surface | | fine granular |
| Elongation of inch sections on stem | | ″.03*, ″.03, ″.02 |

## No. 7115.

Marks, $\overset{1.09\ C}{TN\ EN}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0003 | .0003 | 0. | |
| 10,000 | .0011 | .0008 | ..... | |
| 20,000 | .0024 | .0013 | ..... | |
| 30,000 | .0038 | .0014 | 0. | |
| 40,000 | .0051 | .0013 | ..... | |
| 50,000 | .0064 | .0013 | 0. | |
| 60,000 | .0079 | .0015 | ..... | |
| 70,000 | .0091 | .0012 | 0. | |
| 80,000 | .0107 | .0016 | 0. | |
| 89,000 | ..... | ..... | ..... | Elastic limit (approximate). |
| 90,000 | .0124 | .0017 | .0006 | |
| 92,000 | .0132 | .0008 | ..... | |
| 94,000 | .0141 | .0009 | ..... | |
| 96,000 | .0155 | .0014 | ..... | |
| 98,000 | .0168 | .0013 | ..... | |
| 100,000 | .0187 | .0019 | .0043 | |
| 110,000 | .03 | .0113 | ..... | |
| 116,400 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 116,400 |
| Elastic limit per square inch of original section (approximate) | do... | 89,000 |
| Elongation after rupture | inch.. | .03 |
| Reduction in diameter at point of rupture | do... | .014 |
| Reduction in area after rupture, per cent of original section | | 5.0 |
| Position of rupture | | at the neck |
| Character of broken surface | | fine granular |

## No. 7116.

Marks, $\frac{A.09\ C}{TN\ EN.}$
Diameter, ″.564.
Sectional area, 25 square inch.
Gauged length on heads, 4″.

| Applied loads per square inch. | In gauged length. | | | Remarks. |
|---|---|---|---|---|
| | Elongation. | Successive elongation. | Set. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | Initial load. |
| 5,000 | .0004 | .0004 | 0. | |
| 10,000 | .0011 | .0007 | ..... | |
| 20,000 | .0023 | .0012 | ..... | |
| 30,000 | .0039 | .0016 | 0. | |
| 40,000 | .0052 | .0013 | ..... | |
| 50,000 | .0065 | .0013 | ..... | |
| 60,000 | .0079 | .0014 | ..... | |
| 70,000 | .0094 | .0015 | .0001 | |
| 78,000 | ..... | ..... | ..... | Elastic limit, approximate. |
| 80,000 | .0115 | .0021 | .0011 | |
| 82,000 | .0130 | .0015 | ..... | |
| 84,000 | .0148 | .0018 | ..... | |
| 86,000 | .0163 | .0015 | ..... | |
| 90,000 | .0222 | .0059 | .0091 | |
| 100,000 | .04 | .0178 | ..... | |
| 110,000 | .05 | .01 | ..... | |
| 113,200 | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 113,200 |
| Elastic limit per square inch of original section (approximate) | do... | 78,000 |
| Elongation after rupture | inch.. | .04 |
| Reduction in diameter at point of rupture | do... | .004 |
| Reduction in area after rupture, per cent of original section | | 1.5 |
| Position of rupture | | at the neck |
| Character of broken surface | | fine, silky |

## CASE-HARDENING EXPERIMENTS WITH STEEL BARS.

### *TABULATION OF TENSION TESTS.*

| No. of test. | Marks. | Diameter. | Sectional area. | | Tensile strength per square inch. | Elongation in 4 inches on heads. | Contraction of area. | Appearance of fracture. | Elongation of inch sections on stem. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Inches.* | *Per cent.* | | " " " | |
| 7041 | .16 C | .564 | .25 | 48,200 | 58,840 | 1.04 | 63.7 | Fine silky | ..... | Steel in natural state turned down from hot-rolled bar. |
| 7042 | .16 C | .564 | .25 | 46,000 | 60,960 | 1.14 | 65.8 | .....do | .32, .54*, .23 | Do. |
| 7043 | .16 C | .564 | .25 | 45,000 | 60,720 | 1.02 | 65.8 | .....do | .28, .49*, .21 | Do. |
| 7056 | .16 C TN EN | .564 | .25 | 40,000 | 56,200 | 1.11 | 61.5 | Silky | .37, .48*, .23 | Heated in lime, not casehardened. |
| 7057 | .16 C TN EN | .564 | .25 | 39,000 | 55,280 | 1.10 | 63.7 | Fine silky, cup shaped | .25, .59*, .24 | Do. |
| 7058 | 16 C TN EN | .564 | .25 | 38,000 | 54,880 | 1.10 | 61.5 | .....do | .24, .59*, .24 | Do. |
| 7059 | 16 C TL EN | .564 | .25 | 43,000 | 55,600 | 1.09 | 61.5 | .....do | .24, .59*, .23 | Do. |
| 7060 | .16 C TL EN | .564 | .25 | 40,000 | 55,200 | 1.09 | 63.7 | .....do | .24, .60*, .22 | Do. |
| 7061 | .16 C TL EN | .564 | .25 | 43,000 | 55,240 | 1.09 | 65.8 | .....do | 24, .59*, 23 | Do. |
| 7090 | .16 C TN EN | .564 | .25 | [1]48,000 | 83,720 | .69 | 49.7 | Silky, opened cracks in surface of stem | ..... | ..... |
| 7091 | .16 C TN EN | .564 | .25 | 55,000 | 81,680 | .65 | 52 2 | Silky, opened minute cracks in stem | ..... | ..... |
| 7092 | .16 C TN EN | .564 | .25 | 49,000 | 84,120 | .63 | 52.2 | Silky oblique, opened cracks along stem | ..... | ..... |
| 7054 | .16 C TN EP | .564 | .25 | [1]44,000 | 83,680 | .67 | 44.6 | .....do | ..... | ..... |
| 7093 | .16 C TN EP | .564 | .25 | 47,000 | 82,680 | .63 | 47.2 | .....do | ..... | ..... |
| 7094 | .16 C TL EN | .564 | .25 | [1]46,000 | 83,600 | .63 | 54.6 | .....do | ..... | ..... |
| 7095 | .16 C TL EN | .564 | .25 | 49,000 | 82,400 | .67 | 54.6 | .....do | ..... | ..... |
| 7055 | .16 C TL EP | .564 | .25 | [1]37,000 | 82,000 | .65 | 41.9 | .....do | ..... | ..... |
| 7096 | .16 C TL EP | .564 | .25 | 47,000 | 82,640 | .64 | 52.2 | Silky, opened cracks along the stem | ..... | ..... |
| 7097 | .16 C TL EP | .564 | .25 | 46,000 | 82,480 | .65 | 49.7 | .....do | ..... | ..... |

[1] Approximate.

## CASE-HARDENING EXPERIMENTS WITH STEEL BARS—Continued.

### *TABULATION OF TENSION TESTS*—Continued.

| No. of test. | Marks. | Diameter. | Sectional area. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation in 4 inches on heads. | Contraction of area. | Appearance of fracture. | Elongation of inch sections on stem. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Inches.* | *Per cent.* | | " " " | |
| 7029 | .16 C TN EN | .588 .300 | .20 | 39,000 | 89,000 | .51 | ..... | Silky, opened cracks along the stem ... | ..... | |
| 7030 | .16 C TN EN | .588 .300 | .20 | 49,000 | 89,100 | .56 | ..... | .....do ..... | ..... | |
| 7031 | .16 C TN EN | .588 .300 | .20 | 54,000 | 87,550 | .61 | ..... | .....do ..... | ..... | |
| 7032 | .16 C TN EP | .588 .300 | .20 | 49,000 | 96,000 | .43 | ..... | Silky, 50 per cent; granular, 50 per cent; cracks along the stem very pronounced. | ..... | |
| 7033 | .16 C TN EP | .588 .300 | .20 | 48,000 | 91,550 | .47 | ..... | Silky, opened cracks in surface of stem. | ..... | |
| 7034 | .16 C TN EP | .588 .300 | .20 | [1]47,000 | 89,050 | .54 | ..... | .....do ..... | ..... | |
| 7035 | .16 C TL EN | .588 .300 | .20 | [1]39,000 | 93,100 | .51 | ..... | Silky, 50 per cent; granular, 50 per cent; opened cracks in stem. | ..... | |
| 7036 | .16 C TL EN | .588 .300 | .20 | 65,000 | 86,000 | .57 | ..... | Silky ..... | ..... | Surface not hardened, can be filed. |
| 7037 | .16 C TL EN | .588 .300 | .20 | 49,000 | 91,500 | .60 | ..... | .....do ..... | ..... | |
| 7038 | .16 C TL EP | .588 .300 | .20 | 39,000 | 90,100 | .49 | ..... | Granular, 80 per cent; silky, 20 per cent; opened cracks in stem. | ..... | |
| 7039 | .16 C TL EP | .588 .300 | .20 | [1]44,000 | 89,500 | .43 | ..... | Silky, 80 per cent; granular, 20 per cent; opened cracks in stem. | ..... | |
| 7040 | .16 C TL EP | .588 .300 | .20 | 40,000 | 87,100 | .35 | ..... | Granular, 90 per cent; silky, 10 per cent; opened cracks in stem. | ..... | |
| 7044 | .34 C | .564 | .25 | 54,000 | 85,000 | .79 | 52.2 | Silky ..... | .17, .44*, .16 | Steel in natural state, turned down from hot-rolled bar. |
| 7045 | .34 C | .564 | .25 | 53,000 | 85,000 | .81 | 52.2 | Fine silky ..... | .17, .44*, .18 | Do. |
| 7046 | .34 C | .564 | .25 | 53,000 | 84,880 | .80 | 52.2 | .....do ..... | .17, .44*, .17 | Do. |
| 7062 | .34 C TN EN | .564 | .25 | 48,000 | 80,720 | .81 | 47.2 | .....do ..... | .17, .39*, .23 | Heated in lime, not casehardened. |
| 7063 | .34 C TN EN | .564 | .25 | 50,000 | 81,600 | .77 | 49.7 | .....do ..... | .15, .22, .37* | Do. |
| 7064 | .34 C TN EN | .564 | .25 | 49,000 | 80,400 | .81 | 47.2 | .....do ..... | .20, .42*, .16 | Do. |
| 7065 | .34 C TL EN | .564 | .25 | 49,000 | 79,200 | .89 | 54.6 | .....do ..... | .20, .47*, .19 | Do. |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 7066 | .34 C TL EN | .564 | .25 | 48,000 | 78,880 | .87 | 54.6 | .....do..... | .19, .47*, .19 | Do. |
| 7067 | .34 C TL EN | .564 | .25 | 48,000 | 78,960 | .88 | 54.6 | .....do..... | .22, .45*, .18 | Do. |
| 7047 | .34 C TN EN | .564 | .25 | [1]37,000 | 106,400 | .52 | 24.6 | Granular, radiating from a silky spot at the circumference; opened cracks in stem. | ..... | |
| 7048 | .34 C TN EN | .564 | .25 | [1]36,000 | 106,840 | .44 | 18.3 | Granular, radiating from a point in circumference; opened cracks in stem. | ..... | |
| 7049 | .34 C TN EN | .564 | .25 | 50,000 | 86,080 | .66 | 39.2 | Silky, oblique; opened cracks in stem | ..... | |
| 7050 | .34 C TN EP | .564 | .25 | [1]42,000 | 98,040 | .55 | 33.5 | Granular, 70 per cent; silky, 30 per cent; opened cracks in stem. | ..... | |
| 7051 | .34 C TN EP | .564 | .25 | 38,000 | 108,200 | .33 | 11.8 | Granular, opened cracks in stem | ..... | |
| 7098 | .34 C TN EP | .564 | .25 | 39,000 | 106,800 | .49 | 21.4 | Granular, radiating from a point in circumference. | ..... | |
| 7052 | .34 C TL EN | .564 | .25 | [1]48,000 | 85,920 | .70 | 41.9 | Silky, oblique; opened cracks in stem | ..... | |
| 7099 | .35 C TL EN | .564 | .25 | [1]44,000 | 98,400 | .52 | 36.4 | Granular, 60 per cent; silky oblique, 40 per cent. | ..... | |
| 7053 | .34 C TL EP | .564 | .25 | [1]34,000 | 104,400 | .17 | 5.0 | Granular, opened cracks in stem | ..... | |
| 7100 | .34 C TL EP | .564 | .25 | [1]39,000 | 106,880 | .45 | 21.4 | Granular, radiating from a point in circumference; very pronounced cracks; opened in stem. | ..... | |
| 7101 | .34 C TN EN | .588 .300 | .20 | 60,000 | 91,000 | .67 | ..... | Silky, opened cracks in stem | ..... | The surface of this specimen could be marked with a file, but with difficulty. |
| 7102 | .34 C TN EN | .588 .300 | .20 | 44,000 | 107,000 | .30 | ..... | Granular | ..... | |
| 7103 | .34 C TN EP | .588 .300 | .20 | [1]38,000 | 111,000 | .18 | ..... | Granular, opened cracks in stem | ..... | |
| 7104 | .34 C TN EP | .588 .800 | .20 | 39,000 | 102,000 | .09 | ..... | .....do..... | ..... | |
| 7105 | .34 C TL EN | .588 .800 | .20 | 38,000 | 107,250 | .09 | ..... | .....do..... | ..... | |
| 7106 | .34 C TL EN | .588 .800 | .20 | [1]38,000 | 109,900 | .19 | ..... | .....do..... | ..... | |
| 7107 | .34 C TL EP | .588 .800 | .20 | [1]38,000 | 109,950 | .15 | ..... | .....do..... | ..... | |
| 7108 | .34 C TL EP | .588 .800 | .20 | [1]38,000 | 104,500 | .05 | ..... | Granular | ..... | |
| 7068 | .55 C | .564 | .25 | 59,000 | 109,920 | .55 | 33.5 | Silky, interspersed with fine granulation. | .13, .28*, .12 | Steel in natural state, turned down from hot-rolled bar. |
| 7069 | .55 C | .564 | .25 | 58,000 | 109,640 | .55 | 33.5 | .....do..... | .16, .25*, .12 | Do. |
| 7070 | .55 C | .564 | .25 | 58,000 | 109,680 | .55 | 33.5 | .....do..... | .14, .28*, .11 | Do. |
| 7109 | .55 C TN EN | .564 | .25 | [1]77,000 | 127,600 | .09 | 5.0 | Granular | ..... | |

[1] Approximate.

## CASE-HARDENING EXPERIMENTS WITH STEEL BARS—Continued.

### *TABULATION OF TENSION TESTS*—Continued.

| No. of test. | Marks. | Diameter. | Sectional area. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation in 4 inches on heads. | Contraction of area. | Appearance of fracture. | Elongation of inch sections on stem. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Inches.* | *Per cent.* | | " " " | |
| 7110 | .55 C TN EN | .564 | .25 | [1]67,000 | 125,200 | .13 | 5.0 | Granular | | |
| 7071 | .73 C | .564 | .25 | 69,000 | 146,800 | .21 | 5.0 | Fine granular | .06, .07, .07* | Steel in natural state, turned down from hot-rolled bar. |
| 7072 | .73 C | .564 | .25 | 69,000 | 142,440 | .16 | 5.0 | .....do | .06*, .05, .04 | Do. |
| 7117 | .73 C | .564 | .25 | 69,000 | 133,120 | .12 | 5.0 | Granular | .03, .04, .04* | Steel in natural state from hot-rolled bar, annealed in ashes. |
| 7111 | .73 C TN EN | .564 | .25 | [1]58,000 | 99,760 | .07 | 5.0 | .....do | | |
| 7112 | .73 C TN EN | .564 | .25 | 62,000 | 116,080 | .11 | 5.0 | .....do | | |
| 7073 | .82 C | .564 | .25 | 65,000 | 143,200 | .27 | 11.8 | Fine granular | .07, .08, .11* | Steel in natural state from hot-rolled bar. |
| 7074 | .82 C | .564 | .25 | 63,000 | 144,400 | .29 | 11.8 | .....do | .10*, .11*, .07 | Do. |
| 7118 | .82 C | .564 | .25 | 69,000 | 137,640 | .14 | 5.0 | Granular | .04*, .05*, .04 | Steel in natural state from hot-rolled bar, annealed in ashes. |
| 7113 | .82 C TN EN | .564 | .25 | [1]58,000 | 106,880 | .05 | 5.0 | ....do | | |
| 7114 | .83 C TN EN | .564 | .25 | 54,000 | 119,200 | .07 | 5.0 | ....do | | |
| 7075 | 1.09 C | .564 | .25 | 72,000 | 129,600 | .12 | 5.0 | Fine granular | .05*, .03, .03 | Steel in natural state from hot-rolled bar. |
| 7076 | 1.09 C | .564 | .25 | 72,000 | 126,800 | .10 | 5.0 | .....do | .03, .04, .03* | Do. |
| 7119 | 1.09 C | .564 | .25 | 74,000 | 118,400 | .09 | 5.0 | .....do | .03*, .03, .02 | Steel in natural state from hot-rolled bar, anhealed in ashes. |
| 7115 | 1.09 C TN EN | .564 | .25 | [1]89,000 | 116,400 | .03 | 5.0 | ....do | | |
| 7116 | 1.09 C TN EN | .564 | .25 | [1]78,000 | 118,200 | .04 | 1.5 | Fine silky | | |

[1] Approximate.

## Compression Tests.

### No. 1168.

Marks, $\overset{16\ C}{TN\ ET}$.
Diameter, 1″.200.
Sectional area, 1.131 square inches.
Length over all, 6″.
Gauged length, 4″.

| Applied loads per square inch. | Compression per inch. | Successive compression per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000125 | .000125 | .000025 | .000025 | |
| 10,000 | .000475 | .000350 | .000050 | .000025 | |
| 20,000 | .000850 | .000375 | .000075 | .000025 | |
| 30,000 | .001375 | .000525 | .000350 | .000275 | |
| 35,000 | .001725 | .000350 | .000525 | .000175 | |
| 40,000 | .002100 | .000375 | .000800 | .000275 | |
| 45,000 | .002825 | .000725 | .001350 | .000550 | |
| 50,000 | .0175 | .014675 | ..... | ..... | |
| 55,000 | .0250 | .0075 | ..... | ..... | |
| 60,000 | .0350 | .0100 | ..... | ..... | |
| 79,660 | ..... | ..... | ..... | ..... | Ultimate strength. |

Failed by triple flexure. Bent 180° and closed down without upture.

### No. 1169.

Marks, $\overset{34\ C}{TN\ EP}$.
Diameter, 1″.200.
Sectional area, 1.131 square inches.
Length over all, 6″.
Gauged length, 4″.

| Applied loads per square inch. | Compression per inch. | Successive compression per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000125 | .000125 | 0. | ..... | |
| 10,000 | .000300 | .000175 | 0. | ..... | |
| 20,000 | .000575 | .000275 | 0. | ..... | |
| 30,000 | .001025 | .000450 | .000025 | .000025 | |
| 40,000 | .001575 | .000550 | .000400 | .000375 | |
| 45,000 | .002050 | .000475 | .000675 | .000275 | |
| 50,000 | .002850 | .000800 | .001225 | .000550 | |
| 55,000 | .0150 | .012150 | ..... | ..... | |
| 60,000 | .0200 | .0050 | ..... | ..... | |
| 89,830 | ..... | ..... | ..... | ..... | Ultimate strength. |

Failed by triple flexure. Bent 170°; then ruptured in the quarter by a shearing fracture beginning at the inside of the bend.

## No. 1170.

Marks, $\frac{55\ C}{TN\ EP}$
Diameter, 1″.200.
Sectional area, 1.131 square inches.
Length over all, 6″.
Gauged length, 4″.

| Applied loads per square inch. | Compression per inch. | Successive compression per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000150 | .000150 | 0. | ..... | |
| 10,000 | .000300 | .000150 | 0. | ..... | |
| 20,000 | .000600 | .000300 | 0. | ..... | |
| 30,000 | .000900 | .000300 | 0. | ..... | |
| 40,000 | .001425 | .000525 | .000200 | .000200 | |
| 45,000 | .001750 | .000325 | .000325 | .000125 | |
| 50,000 | .002300 | .000550 | .000650 | .000325 | |
| 55,000 | .006575 | .004275 | .005275 | .004625 | |
| 60,000 | .0075 | .000925 | ..... | ..... | |
| 111,050 | ..... | ..... | ..... | ..... | Ultimate strength. |

Failed by triple flexure. Bent 130°, and then fractured, beginning on the tension side of the bend. Opened numerous fine cracks on the tension side.

## No. 1171.

Marks, $\frac{.73\ C}{TN\ EP}$
Diameter, 1″.200.
Sectional area, 1.131 square inches.
Length over all, 6″.
Gauged length, 4″.

| Applied loads per square inch. | Compression per inch. | Successive compression per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000075 | .000075 | 0. | ..... | |
| 10,000 | .000275 | .000200 | 0. | ..... | |
| 20,000 | .000600 | .000325 | 0. | ..... | |
| 30,000 | .000950 | .000350 | 0. | ..... | |
| 40,000 | .001325 | .000375 | .000050 | .000050 | |
| 45,000 | .001550 | .000225 | .000150 | .000100 | |
| 50,000 | .001850 | .000300 | .000275 | .000125 | |
| 55,000 | .002225 | .000375 | .000425 | .000150 | |
| 60,000 | .002975 | .000750 | .000950 | .000525 | |
| 131,650 | ..... | ..... | ..... | ..... | Ultimate strength. |

Failed by triple flexure. Bent 30°. Fractured at the middle of length. Granular on the tension side; smooth, lustrous on the compression side. Opened a tension fracture $\frac{1}{4}$″ from the end of the specimen.

## No. 1172.

Marks, $\overset{.82\ C}{TN\ EP}$
Diameter, 1″.200.
Sectional area, 1.131 square inches.
Length over all, 6″.
Gauged length, 4″.

| Applied loads per square inch. | Compression per inch. | Successive compression per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000100 | .000100 | 0. | 0. | |
| 10,000 | .000275 | .000175 | 0. | 0. | |
| 20,000 | .000625 | .000350 | 0. | 0. | |
| 30,000 | .001000 | .000375 | .000075 | .000075 | |
| 35,000 | .001200 | .000200 | .000150 | .000075 | |
| 40,000 | .001425 | .000225 | .000225 | .000075 | |
| 45,000 | .001725 | .000300 | .000300 | .000075 | |
| 50,000 | .002025 | .000300 | .000450 | .000150 | |
| 55,000 | .002575 | .000550 | .000800 | .000350 | |
| 60,000 | .004325 | .001750 | .002150 | .001350 | |
| 130,150 | ..... | ..... | ..... | ..... | Ultimate strength. |

Failed by triple flexure. Bent about 20°, and then fractured from the tension side, with a granular appearance. Smooth lustrous next the compression side of the bend.

## No. 1173.

Marks, $\overset{1.09\ C}{TN\ EP}$
Diameter, 1″.200.
Sectional area, 1.131 square inches.
Length over all, 6″.
Gauged length, 4″.

| Applied loads per square inch. | Compression per inch. | Successive compression per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000125 | .000125 | 0. | ..... | |
| 10,000 | .000300 | .000175 | .000025 | .000025 | |
| 20,000 | .000675 | .000375 | .000050 | .000025 | |
| 30,000 | .000975 | .000300 | .000075 | .000025 | |
| 35,000 | .001200 | .000225 | .000075 | 0. | |
| 40,000 | .001375 | .000175 | .000100 | .000025 | |
| 45,000 | .001550 | .000175 | .000175 | .000075 | |
| 50,000 | .001825 | .000275 | .000250 | .000075 | |
| 55,000 | .002100 | .000275 | .000350 | .000100 | |
| 60,000 | .002500 | .000400 | .000550 | .000200 | |
| 139,080 | ..... | ..... | ..... | ..... | Ultimate strength. |

Failed by triple flexure. Bent about 20°, and then fractured from the tension side, with a granular appearance.

# RESISTANCE OF JACKETED BULLETS WHEN FORCED THROUGH THE BORE OF .30-CALIBER PRESSURE BARRELS.

Experiments were made with two barrels of different diameters of the bore, marked Nos. 3 and 5, respectively, and with three kinds of bullets.

Two kinds of bullets were of the service type, measuring ".307 and ".308 in diameter, respectively, and an experimental 3-banded bullet measuring ".304 in diameter at the front bearing.

The bullets were forced through the barrels without any lubricant, the experiments following each other in the order of the numbers of the tests. A new bullet was used in each experiment.

Pressures were applied to the base of the bullets by means of pistons nearly filling the bore of the barrel, pistons of different lengths were employed, and the tests interrupted when the stroke of a given piston was exhausted.

The time when the pistons were changed is noted in the details of the tests.

The bullets took the rifling of the barrels with fairly smooth cuts in the early tests of each barrel. In the subsequent experiments the bullets showed rougher abraded surfaces, and greater resistances in forcing the bullets through the barrels were encountered in such cases.

## Barrels and Bullets Received from Frankford Arsenal.

Barrel No. 3, ".3079 diameter at bottom of grooves.
Barrel No. 5, ".311 diameter at bottom of grooves.
Service bullets, { ".308 maximum diameter. ".307 minimum diameter.
Experimental 3-band bullets, ".304 diameter, front bearing.

BARREL No. 3.

| Total travel of bullet. | Resistance. | | | Remarks. |
|---|---|---|---|---|
| | No. 9875. | No. 9876. | No. 9877. | |
| | Bullet, ".307 diameter. | Bullet, ".308 diameter. | 3-band bullet, ".304 diameter. | |
| *Inches.* | *Pounds.* | *Pounds.* | *Pounds.* | |
| .10 | 165 | 201 | 13 | |
| .20 | 272 | 366 | 81 | |
| .30 | 321 | 524 | 65 | |
| .40 | 450 | 636 | 85 | |
| .50 | 584 | 855 | 102 | |
| .60 | 730 | 1,202 | 199 | |
| .68 | 766 | ..... | ..... | |
| .70 | 748 | 1,262 | 192 | |
| .80 | 754 | 1,289 | 167 | |
| .90 | 738 | 1,122 | 151 | |
| 1.00 | 734 | 1,104 | 155 | |
| 1.10 | 736 | 1,076 | 149 | |
| 1.20 | 738 | 1,046 | 146 | |
| 1.30 | 738 | 1,026 | 138 | |
| 1.50 | 732 | 998 | 135 | |
| 1.70 | 730 | 954 | 129 | |
| 2.00 | 708 | 938 | 126 | |
| 2.50 | 648 | 904 | 125 | |
| 3.00 | 593 | 874 | 117 | |
| 3.50 | 562 | 846 | 109 | |
| 4.00 | 510 | 790 | 105 | |
| 5.00 | 479 | 726 | 100 | |
| 6.00 | 468 | 710 | 99 | |
| 7.00 | 487 | 750 | 91 | |
| 7.90 | 484 | 778 | 81 | |
| 8.00 | 470 | 780 | 119 | Changed pistons. |
| 9.00 | 495 | 752 | 116 | |
| 10.00 | 477 | 708 | 120 | |
| 11.00 | 487 | 772 | 120 | |
| 12.00 | 469 | 736 | 115 | |
| 13.00 | 430 | 692 | 118 | |
| 14.00 | 370 | 614 | 120 | |
| 15.00 | 364 | 556 | 118 | |
| 16.00 | 347 | 560 | 117 | |
| 17.00 | 389 | 634 | 118 | |
| 18.00 | 415 | 704 | 126 | Changed pistons. |
| 19.00 | 397 | 694 | 129 | |
| 20.00 | 374 | 665 | 125 | |
| 21.00 | 371 | 694 | 122 | |
| 22.00 | 385 | 718 | 123 | |
| 23.00 | 348 | 620 | 122 | |
| 24.00 | 330 | 558 | 123 | |
| 25.00 | 320 | 523 | 128 | |
| 26.00 | 345 | 619 | 126 | |
| 27.00 | 392 | 718 | 126 | |
| 27.60 | ..... | 760 | 80 | |

DUPLICATE TESTS WITH BARREL No. 3.

| Total travel of bullet. | Resistance. | | | Remarks. |
|---|---|---|---|---|
| | No. 9878. | No. 9879. | No. 9880. | |
| | Bullet ".307 diameter. | Bullet ".308 diameter. | 3-band bullet, ".304 diameter. | |
| *Inches.* | *Pounds.* | *Pounds.* | *Pounds.* | |
| .10 | 168 | 149 | 76 | |
| .20 | 281 | 302 | 87 | |
| .30 | 376 | 436 | 79 | |
| .40 | 502 | 576 | 144 | |
| .50 | 656 | 730 | 217 | |
| .60 | 724 | 959 | 205 | |
| .70 | 896 | 987 | 197 | |
| .80 | 882 | 1,002 | 192 | |
| .90 | 827 | 1,004 | 196 | |
| 1.00 | 843 | 1,027 | 187 | |
| 1.20 | 848 | 1,068 | 199 | |
| 1.50 | 878 | 1,140 | 187 | |
| 2.00 | 839 | 1,180 | 192 | |
| 2.50 | 780 | 1,102 | 188 | |
| 3.00 | 668 | 954 | 169 | |
| 4.00 | 605 | 812 | 174 | |
| 5.00 | 559 | 667 | 160 | |
| 6.00 | 530 | 614 | 135 | |
| 7.00 | 560 | 638 | 135 | |
| | | | | Changed pistons |
| 8.00 | 552 | 658 | 130 | |
| 9.00 | 554 | 620 | 124 | |
| 10.00 | 523 | 592 | 116 | |
| 12.00 | 550 | 604 | 110 | |
| 14.00 | 452 | 498 | 112 | |
| 16.00 | 405 | 465 | 107 | |
| 17.00 | 478 | 523 | 108 | |
| | | | | Changed pistons. |
| 18.00 | 542 | 560 | 98 | |
| 20.00 | 510 | 524 | 99 | |
| 22.00 | 564 | 554 | 98 | |
| 24.00 | 420 | 466 | 87 | |
| 26.00 | 470 | 488 | 97 | |
| 27.50 | 584 | ..... | 98 | |
| 27.60 | ..... | 597 | ..... | |

BARREL No. 5. ″.311 DIAMETER AT BOTTOM OF GROOVES.

| Total travel of bullet. | Resistance. | | | Remarks. |
|---|---|---|---|---|
| | No. 9881. | No. 9882. | No. 9883. | |
| | Bullet ″.307 diameter. | Bullet ″.308 diameter. | 3-band bullet, ″.304 diameter. | |
| *Inches.* | *Pounds.* | *Pounds.* | *Pounds.* | |
| .10 | 172 | 164 | 89 | |
| .20 | 254 | 302 | 76 | |
| .30 | 352 | 452 | 73 | |
| .40 | 450 | 581 | 132 | |
| .50 | 590 | 696 | 196 | |
| .60 | 763 | 924 | 181 | |
| .70 | 839 | 961 | 182 | |
| .80 | 861 | 978 | 179 | |
| .90 | 824 | 978 | 179 | |
| 1.00 | 838 | 949 | 186 | |
| 1.20 | 794 | 943 | 179 | |
| 1.50 | 764 | 918 | 178 | |
| 2.00 | 754 | 896 | 156 | |
| 2.50 | 692 | 851 | 153 | |
| 3.00 | 670 | 838 | 147 | |
| 4.00 | 573 | 770 | 150 | |
| 5.00 | 486 | 696 | 154 | |
| 6.00 | 478 | 678 | 153 | |
| 7.00 | 455 | 646 | 143 | |
| | | | | Changed pistons. |
| 8.00 | 473 | 648 | 142 | |
| 9.00 | 465 | 670 | 138 | |
| 10.00 | 462 | 625 | 128 | |
| 12.00 | 496 | 698 | 127 | |
| 14.00 | 392 | 545 | 127 | |
| 16.00 | 397 | 523 | 131 | |
| 17.00 | 384 | 513 | 131 | |
| | | | | Changed pistons. |
| 18.00 | 390 | 530 | 133 | |
| 20.00 | 392 | 556 | 140 | |
| 22.00 | 431 | 598 | 137 | |
| 24.00 | 341 | 471 | 138 | |
| 26.00 | 306 | 450 | 132 | |
| 27.20 | ..... | ..... | 134 | |
| 27.40 | 396 | ..... | ..... | |
| 27.45 | ..... | 522 | ..... | |

BARREL No. 5. ".311 DIAMETER AT BOTTOM OF GROOVES.

[Duplicate tests.]

| Total travel of bullet. | Resistance. | | | Remarks. |
|---|---|---|---|---|
| | No. 9884. | No. 9885. | No. 9886. | |
| | Bullet ".307 diameter. | Bullet ".308 diameter. | 3-band bullet, ".304 diameter. | |
| *Inches.* | *Pounds.* | *Pounds.* | *Pounds.* | |
| .10 | 135 | 184 | 73 | |
| .20 | 224 | 281 | 74 | |
| .30 | 319 | 390 | 70 | |
| .40 | 420 | 508 | 110 | |
| .50 | 542 | 626 | 202 | |
| .60 | 748 | 852 | 182 | |
| .70 | 819 | 900 | 194 | |
| .80 | 866 | 928 | 186 | |
| .90 | 898 | 946 | 186 | |
| 1.00 | 896 | 965 | 185 | |
| 1.20 | 904 | 1,029 | 186 | |
| 1.50 | 965 | 1,074 | 202 | |
| 2.00 | 910 | 1,159 | 220 | |
| 2.50 | 796 | 924 | 204 | |
| 3.00 | 724 | 853 | 205 | |
| 4.00 | 626 | 685 | 183 | |
| 5.00 | 576 | 582 | 167 | |
| 6.00 | 550 | 546 | 159 | |
| 7.00 | 535 | 549 | 152 | Changed pistons. |
| 8.00 | 568 | 542 | 139 | |
| 9.00 | 580 | 562 | 128 | |
| 10.00 | 560 | 543 | 113 | |
| 12.00 | 658 | 604 | 116 | |
| 14.00 | 508 | 496 | 113 | |
| 16.00 | 456 | 416 | 105 | |
| 17.00 | 457 | 428 | 108 | Changed pistons. |
| 18.00 | 496 | 460 | 107 | |
| 20.00 | 503 | 456 | 109 | |
| 22.00 | 530 | 510 | 110 | |
| 24.00 | 432 | 381 | 111 | |
| 26.00 | 427 | 392 | 107 | |
| 27.22 | ..... | ..... | 107 | |
| 27.25 | ..... | 470 | ..... | |
| 27.35 | 517 | ..... | ..... | |

BARREL No. 5.—BULLETS FORCED THROUGH AT HIGHER RATES OF SPEED.

| No. of test. | Description of bullet. | Maximum resistance. | Total travel of bullet at time of maximum resistance. |
|---|---|---|---|
| | | *Pounds.* | *Inches.* |
| 9887 | Service, ".307 diameter | 1,650 | 2.35 |
| 9888 | Service, ".308 diameter | 2,340 | 2.12 |
| 9889 | 3 bands, ".304 diameter | 292 | 3.40 |
| 9890 | Service, ".307 diameter | 2,750 | Disabled the piston. |

BARREL No. 5.—BULLETS FORCED THROUGH AT LOW RATES OF SPEED.

| Total travel of bullet. | Resistance. | | Remarks. |
|---|---|---|---|
| | No. 9891. | No. 9892. | |
| | Bullet ".307 diameter. | 3-band bullet, ".304 diameter. | |
| *Inches.* | *Pounds.* | *Pounds.* | |
| .10 | 118 | 65 | |
| .20 | 218 | 62 | |
| .30 | 298 | 62 | |
| .40 | 396 | 127 | |
| .50 | 544 | 181 | |
| .60 | 713 | 169 | |
| .70 | 811 | 157 | |
| .80 | 878 | 166 | |
| .90 | 902 | 164 | |
| 1.00 | 908 | 178 | |
| 1.20 | 1,102 | 216 | |
| 1.40 | 1,380 | ..... | |
| 1.50 | 1,538 | 260 | |
| 1.90 | 1,670 | ..... | |
| 2.00 | 1,660 | 248 | |
| 2.50 | 2,280 | 224 | |
| 3.00 | 1,610 | 211 | Changed pistons. |
| 3.50 | 1,344 | 198 | |
| 4.00 | 985 | 176 | |
| 5.00 | 532 | 178 | |
| 6.00 | 502 | 183 | |
| 7.00 | 516 | 191 | |
| 8.00 | 654 | 213 | |
| 9.00 | 647 | 144 | Changed pistons. |
| 10.00 | 514 | 121 | |
| 11.00 | 598 | 132 | |
| 12.00 | 576 | 110 | |
| 14.00 | 356 | 89 | |
| 16.00 | 331 | 78 | |
| 17.00 | 384 | 84 | Changed pistons. |
| 18.00 | 434 | 83 | |
| 20.00 | 395 | 86 | |
| 22.00 | 448 | 79 | |
| 24.00 | 267 | 58 | |
| 26.00 | 282 | 65 | |
| 27.50 | 382 | 76 | |

## No. 9893.

BARREL No. 3.—BULLET FORCED THROUGH AT HIGHER RATE OF SPEED.

| Description of bullet. | Maximum resistance. | Travel of bullet at time of maximum resistance. |
|---|---|---|
| | *Pounds.* | *Inches.* |
| Service, ".307 diameter | 1,740 | 1.8 |

## No. 9894.

BARREL No. 3.—SERVICE BULLET ".307 DIAMETER FORCED THROUGH AT LOW RATE OF SPEED.

| Total travel of bullet. | Resistance. | Remarks. | Total travel of bullet. | Resistance. | Remarks. |
|---|---|---|---|---|---|
| *Inches.* | *Pounds.* | | *Inches.* | *Pounds.* | |
| .10 | 135 | | 5.00 | 1,144 | |
| .20 | 228 | | 6.00 | 1,047 | |
| .30 | 338 | | 7.00 | 1,098 | |
| .40 | 487 | | 8.00 | 1,165 | |
| .50 | 616 | | 9.00 | 1,088 | |
| .60 | 840 | | | | Changed pistons. |
| .70 | 891 | | 10.00 | 868 | |
| .80 | 933 | | 11.00 | 926 | |
| .90 | 1,000 | | 12.00 | 876 | |
| 1.00 | 1,081 | | 14.00 | 660 | |
| 1.20 | 1,340 | | 16.00 | 625 | |
| 1.50 | 1,996 | | 17.00 | 668 | |
| 1.64 | 2,476 | | | | Changed pistons. |
| 2.00 | 2,720 | | 18.00 | 762 | |
| 2.50 | 2,400 | | 20.00 | 740 | |
| 3.00 | 2,340 | | 22.00 | 773 | |
| | | Changed pistons. | 24.00 | 542 | |
| 3.50 | 1,740 | | 26.00 | 537 | |
| 4.00 | 1,490 | | 26.54 | 696 | |

# STEEL FOR GUN MOUNTS.

## SPECIMENS FROM PIVOT SOCKETS, PIVOT YOKES, INNER BASES, OUTER BASES, AXLES, PISTON RODS, AND CASEMATE MOUNTS, FOR 6-POUNDER AND 15-POUNDER MOUNTS.

# PIVOT SOCKETS—6-POUNDER GUN MOUNTS.

## STEEL CASTINGS.

## No. 6453.

Marks, $\overset{A\ 25}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 15,000 | .00050 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00010 | ..... | ..... | |
| 25,000 | .00090 | .00030 | ..... | ..... | |
| 27,000 | .00100 | .00010 | ..... | ..... | |
| 28,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 29,000 | .00840 | .00735 | ..... | ..... | |
| 30,000 | .00900 | .00060 | ..... | ..... | |
| 31,000 | .01000 | .00100 | ..... | ..... | |
| 32,000 | .01100 | .00100 | ..... | ..... | |
| 33,000 | .01215 | .00115 | ..... | ..... | |
| 34,000 | .01310 | .00095 | ..... | ..... | |
| 35,000 | .01450 | .00140 | ..... | ..... | |
| 36,000 | .01575 | .00125 | ..... | ..... | |
| 37,000 | .01725 | .00150 | ..... | ..... | |
| 38,000 | .01850 | .00125 | ..... | ..... | |
| 64,950 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 64,950 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .2550 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.27*, ″.24 |

## No. 6454.

Marks, $\overset{A\ 26}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00020 | .00010 | ..... | ..... | |
| 15,000 | .00050 | .00030 | ..... | ..... | |
| 20,000 | .00065 | .00015 | ..... | ..... | |
| 25,000 | .00090 | .00025 | ..... | ..... | |
| 28,000 | .00105 | .00015 | ..... | ..... | |
| 29,000 | .00110 | .00005 | ..... | ..... | |
| 30,000 | .00120 | .00010 | ..... | ..... | Elastic limit. |
| 31,000 | .01060 | .00940 | ..... | ..... | |
| 32,000 | .01195 | .00135 | ..... | ..... | |
| 33,000 | .01265 | .00070 | ..... | ..... | |
| 34,000 | .01360 | .00095 | ..... | ..... | |
| 35,000 | .01525 | .00165 | ..... | ..... | |
| 36,000 | .01625 | .00100 | ..... | ..... | |
| 37,000 | .01750 | .00125 | ..... | ..... | |
| 38,000 | .01900 | .00150 | ..... | ..... | |
| 39,000 | .02050 | .00150 | ..... | ..... | |
| 64,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 64,900 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .2250 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | dull silky |
| Elongation of inch sections | | ″.23*, ″.22 |

## No. 6455.

Marks, $\frac{A\ 27}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | ..... | ..... | |
| 10,000 | .00020 | .00015 | ..... | ..... | |
| 15,000 | .00035 | .00015 | ..... | ..... | |
| 20,000 | .00055 | .00020 | ..... | ..... | |
| 25,000 | .00075 | .00020 | ..... | ..... | |
| 26,000 | .00080 | .00005 | ..... | ..... | |
| 27,000 | .00095 | .00015 | ..... | ..... | Elastic limit. |
| 28,000 | .00825 | .00730 | ..... | ..... | |
| 29,000 | .00925 | .00100 | ..... | ..... | |
| 30,000 | .00985 | .00060 | ..... | ..... | |
| 31,000 | .01010 | .00025 | ..... | ..... | |
| 32,000 | .01165 | .00155 | ..... | ..... | |
| 33,000 | .01235 | .00070 | ..... | ..... | |
| 34,000 | .01385 | .00150 | ..... | ..... | |
| 35,000 | .01535 | .00150 | ..... | ..... | |
| 36,000 | .01615 | .00080 | ..... | ..... | |
| 37,000 | .01775 | .00160 | ..... | ..... | |
| 64,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 64,500 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .2600 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.30*, ″.22 |

## No. 6456.

Marks, $\frac{A\ 28}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00030 | .00015 | ..... | ..... | |
| 15,000 | .00050 | .00020 | ..... | ..... | |
| 20,000 | .00095 | .00045 | ..... | ..... | |
| 21,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 22,000 | .00275 | .00175 | ..... | ..... | |
| 23,000 | .00860 | .00585 | ..... | ..... | |
| 24,000 | .00910 | .00050 | ..... | ..... | |
| 25,000 | .01000 | .00090 | ..... | ..... | |
| 26,000 | .01255 | .00255 | ..... | ..... | |
| 27,000 | .01335 | .00080 | ..... | ..... | |
| 28,000 | .01610 | .00275 | ..... | ..... | |
| 29,000 | .01800 | .00190 | ..... | ..... | |
| 30,000 | .01950 | .00150 | ..... | ..... | |
| 31,000 | .02225 | .00275 | ..... | ..... | |
| 52,350 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 52,350 |
| Elastic limit per square inch of original section | do... | 21,000 |
| Elongation per inch after rupture | inch.. | .3650 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .185 |
| Reduction in area after rupture, per cent of original section | | 59.8 |
| Position of rupture | | 1″.50 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.29, ″.44* |

## No. 6473.

Marks, $\overset{A\ 28}{2\ P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 15,000 | .00050 | .00020 | ..... | ..... | |
| 20,000 | .00070 | .00020 | ..... | ..... | Elastic limit. |
| 21,000 | .00180 | .00110 | ..... | ..... | |
| 22,000 | .00200 | .00020 | ..... | ..... | |
| 23,000 | .00275 | .00075 | ..... | ..... | |
| 24,000 | .00375 | .00100 | ..... | ..... | |
| 25,000 | .01150 | .00775 | ..... | ..... | |
| 26,000 | .01350 | .00200 | ..... | ..... | |
| 27,000 | .01525 | .00175 | ..... | ..... | |
| 28,000 | .01625 | .00100 | ..... | ..... | |
| 29,000 | .01950 | .00325 | ..... | ..... | |
| 30,000 | .02125 | .00175 | ..... | ..... | |
| 51,450 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 51,450 |
| Elastic limit per square inch of original section | do... | 20,000 |
| Elongation per inch after rupture | inch.. | .2950 |
| Elongation per inch under strain at elastic limit | do... | .00070 |
| Reduction in diameter at point of rupture | do... | .115 |
| Reduction in area after rupture, per cent of original section | | 40.8 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.35*, ″.24 |

## No. 6457.

Marks, $\frac{A\ 29}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 15,000 | .00050 | .00025 | ..... | ..... | |
| 18,000 | .00065 | .00015 | ..... | ..... | |
| 19,000 | .00075 | .00010 | ..... | ..... | Elastic limit. |
| 20,000 | .00105 | .00080 | ..... | ..... | |
| 21,000 | .00150 | .00045 | ..... | ..... | |
| 22,000 | .00240 | .00090 | ..... | ..... | |
| 23,000 | .00815 | .00575 | ..... | ..... | |
| 24,000 | .00985 | .00120 | ..... | ..... | |
| 25,000 | .01050 | .00115 | ..... | ..... | |
| 26,000 | .01260 | .00210 | ..... | ..... | |
| 27,000 | .01400 | .00140 | ..... | ..... | |
| 28,000 | .01750 | .00350 | ..... | ..... | |
| 29,000 | .01825 | .00075 | ..... | ..... | |
| 30,000 | .02075 | .00250 | ..... | ..... | |
| 31,000 | .02210 | .00185 | ..... | ..... | |
| 32,000 | .02425 | .00215 | ..... | ..... | |
| 51,900 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 51,900 |
| Elastic limit per square inch of original section | do... | 19,000 |
| Elongation per inch after rupture | inch.. | .3700 |
| Elongation per inch under strain at elastic limit | do... | .00075 |
| Reduction in diameter at point of rupture | do... | .185 |
| Reduction in area after rupture, per cent of original section | | 59.8 |
| Position of rupture | | 1″.30 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.41*, ″.33 |

## No. 6474.

Marks, $\overset{A\ 29}{2\ P\ S\ 6}$.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 15,000 | .00050 | .00020 | ..... | ..... | |
| 20,000 | .00080 | .00030 | ..... | ..... | |
| 22,000 | .00095 | .00015 | ..... | ..... | |
| 24,000 | .00110 | .00015 | ..... | ..... | Elastic limit. |
| 25,000 | .01275 | .01165 | ..... | ..... | |
| 26,000 | .01470 | .00195 | ..... | ..... | |
| 27,000 | .01625 | .00155 | ..... | ..... | |
| 28,000 | .01825 | .00200 | ..... | ..... | |
| 29,000 | .02075 | .00250 | ..... | ..... | |
| 30,000 | .02275 | .00200 | ..... | ..... | |
| 31,000 | .02525 | .00250 | ..... | ..... | |
| 32,000 | .02725 | .00200 | ..... | ..... | |
| 33,000 | .03200 | .00475 | ..... | ..... | |
| 34,000 | .03520 | .00320 | ..... | ..... | |
| 50,900 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 50,900 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .3500 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | 1″.25 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.40*, ″.30 |

## No. 6612.

Marks, $\frac{A\ 30.}{P\ S\ 6.}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00020 | .00015 | ..... | ..... | |
| 20,000 | .00055 | .00035 | ..... | ..... | |
| 27,000 | .00080 | .00025 | ..... | ..... | Elastic limit. |
| 28,000 | .00205 | .00125 | ..... | ..... | |
| 29,000 | .01950 | .01745 | ..... | ..... | |
| 30,000 | .02050 | .00100 | ..... | ..... | |
| 31,000 | .02375 | .00325 | ..... | ..... | |
| 32,000 | .02690 | .00315 | ..... | ..... | |
| 53,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 53,550 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .3700 |
| Elongation per inch under strain at elastic limit | do... | .00080 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | 1″.27 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.30, ″.44* |

## No. 6714.

Marks, $\frac{A\ 30}{2\ P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | ..... | ..... | |
| 10,000 | .00040 | .00030 | ..... | ..... | |
| 20,000 | .00070 | .00030 | ..... | ..... | |
| 28,000 | .00105 | .00035 | ..... | ..... | Elastic limit. |
| 29,000 | .02075 | .01970 | ..... | ..... | |
| 30,000 | .02400 | .00325 | ..... | ..... | |
| 31,000 | .02700 | .00300 | ..... | ..... | |
| 32,000 | .03075 | .00375 | ..... | ..... | |
| 33,000 | .03250 | .00175 | ..... | ..... | |
| 51,300 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 51,300 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .3050 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .115 |
| Reduction in area after rupture, per cent of original section | | 40.8 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | dull silky |
| Elongation of inch sections | | ″.25, ″.36* |

## No. 6746.

Marks, $\frac{A\ 31}{2\text{-}P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00025 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | Elastic limit. |
| 31,000 | .00650 | .00550 | ..... | ..... | |
| 32,000 | .00750 | .00100 | ..... | ..... | |
| 33,000 | .00850 | .00100 | ..... | ..... | |
| 34,000 | .00900 | .00050 | ..... | ..... | |
| 35,000 | .01000 | .00100 | ..... | ..... | |
| 64,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds... | 64,900 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .0650 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .025 |
| Reduction in area after rupture, per cent of original section | | 9.5 |
| Position of rupture | | ″.5 from neck |
| Character of broken surface | | granular, 85 per cent; dull silky, 15 per cent |
| Elongation of inch sections | | ″.07, ″.10* |

## No. 6712.

Marks, $\frac{A\ 32}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 15,000 | .00040 | .00015 | ..... | ..... | |
| 18,000 | .00060 | .00020 | ..... | ..... | |
| 19,000 | .00070 | .00010 | ..... | ..... | Elastic limit. |
| 20,000 | .00270 | .00200 | ..... | ..... | |
| 21,000 | .00575 | .00305 | ..... | ..... | |
| 22,000 | .00750 | .00175 | ..... | ..... | |
| 23,000 | .00825 | .00075 | ..... | ..... | |
| 24,000 | .01050 | .00225 | ..... | ..... | |
| 51,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 51,000 |
| Elastic limit per square inch of original section | do... | 19,000 |
| Elongation per inch after rupture | inch.. | .8700 |
| Elongation per inch under strain at elastic limit | do... | .00070 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | ″.8 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.26, ″.48* |

## No. 6713.

Marks, $\frac{A\ 88}{P\ 8\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds... | 55,400 |
| Elastic limit per square inch of original section | do... | 20,000 |
| Elongation per inch after rupture | inch.. | .3250 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .126 |
| Reduction in area after rupture, per cent of original section | | 45.8 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.34*, ″.31* |

## No. 6715.

Marks, $\frac{A\ 84}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00035 | .00030 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00090 | .00030 | ..... | ..... | |
| 31,000 | .00095 | .00005 | ..... | ..... | Elastic limit. |
| 32,000 | .00700 | .00605 | ..... | ..... | |
| 33,000 | .00950 | .00250 | ..... | ..... | |
| 34,000 | .01525 | .00575 | ..... | ..... | |
| 35,000 | .01600 | .00075 | ..... | ..... | |
| 36,000 | .01675 | .00075 | ..... | ..... | |
| 66,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,550 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .2450 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | dull silky; opened cracks along the length of the stem |
| Elongation of inch sections | | ″.23*, ″.21 |

## No. 6716.

Marks, $\begin{matrix} A\ 35 \\ P\ S\ 6 \end{matrix}$
Diameter, ″.505.
Sectional area, .20 square inch,
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00085 | .00030 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 31,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 32,000 | .00700 | .00595 | ..... | ..... | |
| 33,000 | .01240 | .00540 | ..... | ..... | |
| 34,000 | .01400 | .00160 | ..... | ..... | |
| 35,000 | .01495 | .00095 | ..... | ..... | |
| 36,000 | .01600 | .00105 | ..... | ..... | |
| 66,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,000 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .2500 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 80.7 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.22, ″.28* |

## No. 6747.

Marks, $\frac{A\ 36}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00025 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 28,000 | .00085 | .00025 | ..... | ..... | |
| 29,000 | .00090 | .00005 | ..... | ..... | Elastic limit. |
| 30,000 | .00150 | .00060 | .00050 | .00050 | |
| 31,000 | .00215 | .00075 | ..... | ..... | |
| 32,000 | .00265 | .00050 | ..... | ..... | |
| 33,000 | .00340 | .00075 | ..... | ..... | |
| 34,000 | .00425 | .00085 | ..... | ..... | |
| 75,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 75,600 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1450 |
| Elongation per inch under strain at elastic limit | do... | .00090 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular 60 per cent, dull silky 40 per cent |
| Elongation of inch sections | | ″.16*, ″.13 |

## No. 6748.

Marks, $\frac{A\ 87}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00030 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 22,000 | .00075 | .00015 | ..... | ..... | |
| 23,000 | .00080 | .00005 | ..... | ..... | Elastic limit. |
| 24,000 | .00150 | .00070 | ..... | ..... | |
| 25,600 | .00245 | .00095 | ..... | ..... | |
| 26,000 | .00310 | .00065 | ..... | ..... | |
| 27,000 | .00400 | .00090 | ..... | ..... | |
| 28,000 | .00500 | .00100 | ..... | ..... | |
| 60,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 60,500 |
| Elastic limit per square inch of original section | do.... | 23,000 |
| Elongation per inch after rupture | inch.. | .2900 |
| Elongation per inch under strain at elastic limit | do.... | .00080 |
| Reduction in diameter at point of rupture | do.... | .125 |
| Reduction in area after rupture, per cent of original section | | 43.3 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.28*, ″.30* |

## No. 6749.

Marks, $\frac{A\ 38}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00030 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 28,000 | .00100 | .00040 | ..... | ..... | Elastic limit. |
| 29,000 | .00135 | .00035 | ..... | ..... | |
| 30,000 | .00155 | .00020 | ..... | ..... | |
| 31,000 | .00190 | .00035 | ..... | ..... | |
| 32,000 | .00245 | .00055 | ..... | ..... | |
| 33,000 | .00340 | .00095 | ..... | ..... | |
| 75,050 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 75,050 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .2050 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 28.9 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | granular 85 per cent dull silky, 15 per cent |
| Elongation of inch sections | | ″.18, ″.23* |

## No. 6758.

Marks, $\frac{A\ 89}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00025 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 25,000 | .00095 | .00035 | ..... | ..... | Elastic limit. |
| 26,000 | .00200 | .00105 | ..... | ..... | |
| 27,000 | .00360 | .00160 | ..... | ..... | |
| 28,000 | .00455 | .00095 | ..... | ..... | |
| 29,000 | .00550 | .00095 | ..... | ..... | |
| 30,000 | .00625 | .00075 | ..... | ..... | |
| 68,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,050 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .1450 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.6 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.16*, ″.13 |

## No. 6759.

Marks, $\frac{A\ 40}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00030 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 25,000 | .00095 | .00035 | ..... | ..... | Elastic limit. |
| 26,000 | .00300 | .00205 | ..... | ..... | |
| 27,000 | .00390 | .00090 | ..... | ..... | |
| 28,000 | .00460 | .00070 | ..... | ..... | |
| 29,000 | .00540 | .00080 | ..... | ..... | |
| 30,000 | .00660 | .00120 | ..... | ..... | |
| 67,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 67,550 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .2050 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.65 from neck |
| Character of broken surface | | granular; silky spot at the circumference |
| Elongation of inch sections | | ″.19, ″.22* |

## No. 6760.

Marks, $\frac{A\ 41}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 24,000 | .00085 | .00025 | ..... | ..... | Elastic limit. |
| 25,000 | .00200 | .00115 | ..... | ..... | |
| 26,000 | .00250 | .00050 | ..... | ..... | |
| 27,000 | .00350 | .00100 | ..... | ..... | |
| 28,000 | .00445 | .00095 | ..... | ..... | |
| 29,000 | .00550 | .00105 | ..... | ..... | |
| 68,200 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per squre inch of original section | pounds.. | 68,200 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .2500 |
| Elongation per inch under strain at elastic limit | do... | .00085 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.22, ″.28* |

## No. 6761.

Marks, $\frac{A\ 42}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | .0 | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 21,000 | .00075 | .00010 | ..... | ..... | Elastic limit. |
| 22,000 | .00140 | .00065 | ..... | ..... | |
| 23,000 | .00180 | .00040 | ..... | ..... | |
| 24,000 | .00180 | 0. | ..... | ..... | |
| 25,000 | .00240 | .00060 | ..... | ..... | |
| 26,000 | .00345 | .00105 | ..... | ..... | |
| 27,000 | .00410 | .00065 | ..... | ..... | |
| 28,000 | .00510 | .00100 | ..... | ..... | |
| 69,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,550 |
| Elastic limit per square inch of original section | do... | 21,000 |
| Elongation per inch after rupture | inch.. | .1700 |
| Elongation per inch under strain of elastic limit | do... | .00075 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.2 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.19*, ″.15 |

## No. 6781.

Marks, $\overset{A\ 42}{2\ P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 23,000 | .00090 | .00030 | ..... | ..... | Elastic limit. |
| 24,000 | .00125 | .00035 | ..... | ..... | |
| 25,000 | .00250 | .00125 | ..... | ..... | |
| 26,000 | .00460 | .00210 | ..... | ..... | |
| 27,000 | .00600 | .00140 | ..... | ..... | |
| 28,000 | .00895 | .00295 | ..... | ..... | |
| 61,300 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 61,300 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .0650 |
| Elongation per inch under strain at elastic limit | do... | .00090 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | at the neck |
| Character of broken surface | | granular, small spongy spot at the circumference |
| Elongation of inch sections | | ″.09, ″.08* |

## No. 6762.

Marks, $\frac{A\ 43}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| 22,000 | .00095 | .00025 | ..... | ..... | |
| 23,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 24,000 | .00140 | .00040 | ..... | ..... | |
| 25,000 | .00250 | .00110 | ..... | ..... | |
| 26,000 | .00300 | .00050 | ..... | ..... | |
| 27,000 | .00395 | .00095 | ..... | ..... | |
| 28,000 | .00495 | .00100 | ..... | ..... | |
| 68,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,500 |
| Elastic limit per square inch of original section | do... | 23,000 |
| Elongation per inch after rupture | inch.. | .2650 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 34.0 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky, 60 per cent; granular, 40 per cent |
| Elongation of inch sections | | ″.28*, ″.25* |

## No. 6768.

Marks, $\frac{A\ 44}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00025 | .00020 | ..... | ..... | |
| 20,000 | .00055 | .00030 | ..... | ..... | |
| 26,000 | .00095 | .00040 | ..... | ..... | Elastic limit. |
| 27,000 | .00115 | .00020 | ..... | ..... | |
| 28,000 | .00205 | .00090 | ..... | ..... | |
| 29,000 | .00255 | .00050 | ..... | ..... | |
| 30,000 | .00305 | .00050 | ..... | ..... | |
| 31,000 | .00405 | .00100 | ..... | ..... | |
| 72,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,550 |
| Elastic limit per square inch of original section | do... | 26,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ″.16, ″.20* |

## No. 6782.

Marks, $\frac{A\ 45}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch,* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 32,000 | .00115 | .00015 | ..... | ..... | Elastic limit. |
| 33,000 | .00200 | .00085 | ..... | ..... | |
| 34,000 | .00850 | .00650 | ..... | ..... | |
| 35,000 | .00950 | .00100 | ..... | ..... | |
| 36,000 | .01015 | .00065 | ..... | ..... | |
| 37,000 | .01150 | .00135 | ..... | ..... | |
| 74,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 74,000 |
| Elastic limit per square inch of original section | do... | 82,000 |
| Elongation per inch after rupture | inch.. | .2050 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 28.9 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular, dull spot at the circumference |
| Elongation of inch sections | | ″.23, ″.18 |

## No. 6783.

Marks, $\overset{A\ 46}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 32,000 | .00110 | .00010 | ..... | ..... | Elastic limit. |
| 33,000 | .00140 | .00030 | ..... | ..... | |
| 34,000 | .00850 | .00710 | ..... | ..... | |
| 35,000 | .00945 | .00095 | ..... | ..... | |
| 36,000 | .00975 | .00030 | ..... | ..... | |
| 37,000 | .01055 | .00080 | ..... | ..... | |
| 75,850 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 75,850 |
| Elastic limit per square inch of original section | do... | 32,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.17, ″.19* |

## No. 6784.

Marks, $\frac{A\ 47}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 28,000 | .00090 | .00030 | ..... | ..... | |
| 29,000 | .00100 | .00010 | ..... | ..... | Elastic limit. |
| 30,000 | .00175 | .00075 | ..... | ..... | |
| 31,000 | .00825 | .00650 | ..... | ..... | |
| 32,000 | .00925 | .00100 | ..... | ..... | |
| 33,000 | .01025 | .00100 | ..... | ..... | |
| 34,000 | .01100 | .00075 | ..... | ..... | |
| 68,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,900 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .2150 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | granular 85 per cent, silky 15 per cent |
| Elongation of inch sections | | ″.20, ″.23* |

## No. 6785.

Marks, $\frac{A\ 48}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | ..... | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 28,000 | .00100 | .00040 | ..... | ..... | Elastic limit. |
| 29,000 | .00150 | .00050 | ..... | ..... | |
| 30,000 | .00700 | .00550 | ..... | ..... | |
| 31,000 | .00800 | .00100 | ..... | ..... | |
| 32,000 | .00900 | .00100 | ..... | ..... | |
| 33,000 | .01015 | .00115 | ..... | ..... | |
| 69,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,600 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .2250 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.21, ″.24* |

## No. 6804.

Marks, $\frac{A\ 49}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 22,000 | .00075 | .00010 | ..... | ..... | |
| 23,000 | .00085 | .00010 | ..... | ..... | Elastic limit. |
| 24,000 | .00155 | .00070 | ..... | ..... | |
| 25,000 | .00245 | .00090 | ..... | ..... | |
| 26,000 | .00350 | .00105 | ..... | ..... | |
| 27,000 | .00460 | .00110 | ..... | ..... | |
| 28,000 | .00550 | .00090 | ..... | ..... | |
| 67,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 67,900 |
| Elastic limit per square inch of original section | do... | 23,000 |
| Elongation per inch after rupture | inch.. | .2500 |
| Elongation per inch under strain at elastic limit | do... | .00085 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | granular 50 per cent, silky 50 per cent |
| Elongation of inch sections | | ″.18, ″.32* |

## No. 6805.

Marks, $\begin{matrix} A\ 50 \\ P\ S\ 6 \end{matrix}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 27,000 | .00100 | .00040 | ..... | ..... | Elastic limit. |
| 28,000 | .00135 | .00035 | ..... | ..... | |
| 29,000 | .00175 | .00040 | ..... | ..... | |
| 30,000 | .00205 | .00030 | ..... | ..... | |
| 31,000 | .00260 | .00055 | ..... | ..... | |
| 32,000 | .00390 | .00130 | ..... | ..... | |
| 75,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 75,100 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .1750 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.16, ″.19* |

## No. 6806.

Marks, $\frac{A\ 51}{PS6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00105 | .00040 | ..... | ..... | |
| 33,000 | .00120 | .00015 | ..... | ..... | Elastic limit. |
| 34,000 | .01175 | .01055 | ..... | ..... | |
| 35,000 | .01250 | .00075 | ..... | ..... | |
| 36,000 | .01350 | .00100 | ..... | ..... | |
| 37,000 | .01440 | .00090 | ..... | ..... | |
| 38,000 | .01550 | .00110 | ..... | ..... | |
| 69,650 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,650 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .2500 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | , | 27.4 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | dull silky 60 per cent, granular 40 per cent |
| Elongation of inch sections | | ″.24, ″.26* |

## No. 6924.

Marks, $\frac{A\ 52}{PS6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00105 | .00040 | ..... | ..... | |
| 36,000 | .00140 | .00035 | ..... | ..... | Elastic limit. |
| 37,000 | .01100 | .00960 | ..... | ..... | |
| 38,000 | .01215 | .00115 | ..... | ..... | |
| 39,000 | .01285 | .00070 | ..... | ..... | |
| 40,000 | .01350 | .00065 | ..... | ..... | |
| 41,000 | .01450 | .00100 | ..... | ..... | |
| 75,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 75,900 |
| Elastic limit per square inch of original section | do... | 36,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .00140 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ″.7 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.23,* ″.15 |

## No. 6937.

Marks, $\frac{A\ 53}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 26,000 | .00090 | .00025 | ..... | ..... | Elastic limit. |
| 27,000 | .00150 | .00060 | ..... | ..... | |
| 28,000 | .00750 | .00600 | ..... | ..... | |
| 29,000 | .00865 | .00115 | ..... | ..... | |
| 30,000 | .00950 | .00085 | ..... | ..... | |
| 31,000 | .01050 | .00100 | ..... | ..... | |
| 66,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,550 |
| Elastic limit per square inch of original section | do... | 26,000 |
| Elongation per inch after rupture | inch.. | 2100 |
| Elongation per inch under strain at elastic limit | do... | .00090 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.23*, ″.19 |

## No. 6918.

Marks, $\frac{A\ 54}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 26,000 | .00095 | .00035 | ..... | ..... | Elastic limit. |
| 27,000 | .00265 | .00170 | ..... | ..... | |
| 28,000 | .00675 | .00410 | ..... | ..... | |
| 29,000 | .00725 | .00050 | ..... | ..... | |
| 30,000 | .00850 | .00125 | ..... | ..... | |
| 31,000 | .00925 | .00075 | ..... | ..... | |
| 66,300 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,300 |
| Elastic limit per square inch of original section | do... | 26,000 |
| Elongation per inch after rupture | inch.. | .2350 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ″.24, ″.23* |

## No. 6938.

Marks, $\frac{A\ 55}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | ..... | ..... | |
| 10,000 | .00040 | .00030 | ..... | ..... | |
| 20,000 | .00070 | .00030 | ..... | ..... | |
| 27,000 | .00110 | .00040 | ..... | ..... | Elastic limit. |
| 28,000 | .00135 | .00025 | ..... | ..... | |
| 29,000 | .00775 | .00640 | ..... | ..... | |
| 30,000 | .00875 | .00100 | ..... | ..... | |
| 31,000 | .00965 | .00090 | ..... | ..... | |
| 32,000 | .01075 | .00110 | ..... | ..... | |
| 65,800 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 65,800 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .2700 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 34.0 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.24, ″.30* |

## No. 6939.

Marks, $\overset{A\ 56}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | ..... | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00110 | .00045 | ..... | ..... | |
| 31,000 | .00120 | .00010 | ..... | ..... | Elastic limit. |
| 32,000 | .00750 | .00630 | ..... | ..... | |
| 33,000 | .00850 | .00100 | ..... | ..... | |
| 34,000 | .00945 | .00095 | ..... | ..... | |
| 35,000 | .01025 | .00080 | ..... | ..... | |
| 36,000 | .01125 | .00100 | ..... | ..... | |
| 72,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,500 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .2450 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 80.7 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.22, ″.27* |

## No. 6940.

Marks, $\frac{A\ 57}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 34,000 | .00120 | .00020 | ..... | ..... | Elastic limit. |
| 35,000 | .00150 | .00030 | ..... | ..... | |
| 36,000 | .00590 | .00440 | ..... | ..... | |
| 37,000 | .00675 | .00085 | ..... | ..... | |
| 38,000 | .00775 | .00100 | ..... | ..... | |
| 39,000 | .00870 | .00095 | ..... | ..... | |
| 84,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 84,000 |
| Elastic limit per square inch of original section | do... | 34,000 |
| Elongation per inch after rupture | inch.. | .1850 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.19, ″.18* |

## No. 6941.

Marks, $\frac{A\ 58}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| 24,000 | .00095 | .00025 | ..... | ..... | Elastic limit. |
| 25,000 | .00115 | .00020 | ..... | ..... | |
| 26,000 | .00150 | .00035 | ..... | ..... | |
| 27,000 | .00205 | .00055 | ..... | ..... | |
| 28,000 | .00450 | .00245 | ..... | ..... | |
| 29,000 | .00550 | .00100 | ..... | ..... | |
| 69,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,450 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .2500 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 34.0 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.29*, ″.21 |

## No. 6942.

Marks, $\begin{matrix} A\ 59 \\ P\ S\ 6 \end{matrix}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 27,000 | .00095 | .00035 | ..... | ..... | Elastic limit. |
| 28,000 | .00200 | .00105 | ..... | ..... | |
| 29,000 | .00525 | .00325 | ..... | ..... | |
| 30,000 | .00645 | .00120 | ..... | ..... | |
| 31,000 | .00720 | .00075 | ..... | ..... | |
| 32,000 | .00800 | .00080 | ..... | ..... | |
| 71,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds | 71,000 |
| Elastic limit per square inch of original section | do | 27,000 |
| Elongation per inch after rupture | inch | .2350 |
| Elongation per inch under strain at elastic limit | do | .00095 |
| Reduction in diameter at point of rupture | do | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.27*, ″.20 |

## No. 6943.

Marks, $\frac{A\ 60}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 34,000 | .00115 | .00015 | ..... | ..... | Elastic limit. |
| 35,000 | .00775 | .00660 | ..... | ..... | |
| 36,000 | .00850 | .00075 | ..... | ..... | |
| 37,000 | .00925 | .00075 | ..... | ..... | |
| 38,000 | .01010 | .00085 | ..... | ..... | |
| 39,000 | .01100 | .00090 | ..... | ..... | |
| 77,700 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 77,700 |
| Elastic limit per square inch of original section | do... | 34,000 |
| Elongation per inch after rupture | inch.. | .2300 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 34.0 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular 40 per cent, dull silky 60 per cent |
| Elongation of inch sections | | ″.24*, ″.22* |

## No. 6944.

Marks, $\frac{A\ 61}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 28,000 | .00100 | .00040 | ..... | ..... | |
| 29,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 30,000 | .00150 | .00045 | ..... | ..... | |
| 31,000 | .00510 | .00360 | ..... | ..... | |
| 32,000 | .00650 | .00140 | ..... | ..... | |
| 33,000 | .00700 | .00050 | ..... | ..... | |
| 34,000 | .00785 | .00085 | ..... | ..... | |
| 75,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 75,900 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.5 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.20*, ″.16 |

## No. 6945.

Marks, $\frac{A\ 62}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | ..... | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| 27,000 | .00100 | .00030 | ..... | ..... | Elastic limit. |
| 28,000 | .00145 | .00045 | ..... | ..... | |
| 29,000 | .00690 | .00545 | ..... | ..... | |
| 30,000 | .00750 | .00060 | ..... | ..... | |
| 31,000 | .00840 | .00090 | ..... | ..... | |
| 32,000 | .00940 | .00100 | ..... | ..... | |
| 69,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,100 |
| Elastic limit per square inch of original section | do.... | 27,600 |
| Elongation per inch after rupture | inch.. | .2150 |
| Elongation per inch under strain at elastic limit | do.... | .00100 |
| Reduction in diameter at point of rupture | do.... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | 1″.2 from neck |
| Character of broken surface | | granular, dull flaky spot at the circumference; opened cracks in the surface of stem |
| Elongation of inch sections | | ″.20, ″.23* |

## No. 6946.

Marks, $\begin{matrix} A\ 63 \\ P\ S\ 6 \end{matrix}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 28,000 | .00095 | .00030 | ..... | ..... | |
| 29,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 30,000 | .00125 | .00025 | ..... | ..... | |
| 31,000 | .00490 | .00365 | ..... | ..... | |
| 32,000 | .00650 | .00160 | ..... | ..... | |
| 33,000 | .00705 | .00055 | ..... | ..... | |
| 34,000 | .00795 | .00090 | ..... | ..... | |
| 74,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 74,100 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1350 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.6 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.12, ″.15* |

## No. 6986.

Marks, $\frac{A\ 64}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | Elastic limit. |
| 31,000 | .00600 | .00500 | ..... | ..... | |
| 32,000 | .00925 | .00325 | ..... | ..... | |
| 33,000 | .01015 | .00090 | ..... | ..... | |
| 34,000 | .01080 | .00065 | ..... | ..... | |
| 35,000 | .01200 | .00120 | ..... | ..... | |
| 69,700 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,700 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .1200 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.13*, ″.11 |

## No. 6977.

Marks, $\overset{A\ 65}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 30,000 | .00095 | .00030 | ..... | ..... | |
| 32,000 | .00105 | .00010 | ..... | ..... | Elastic limit. |
| 33,000 | .00900 | .00795 | ..... | ..... | |
| 34,000 | .00970 | .00070 | ..... | ..... | |
| 35,000 | .01050 | .00080 | ..... | ..... | |
| 36,000 | .01155 | .00105 | ..... | ..... | |
| 37,000 | .01250 | .00095 | ..... | ..... | |
| 71,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,000 |
| Elastic limit per square inch of original section.. | do... | 82,000 |
| Elongation per inch after rupture | inch.. | .1950 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | silky oblique 30 per cent, granular 70 per cent |
| Elongation of inch sections | | ″.21*, ″.18 |

# AXLES—6-POUNDER MOUNTS.

## STEEL FORGINGS.

## No. 6590.

Marks, $\frac{A\ .21}{A\ X\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 27,000 | .00080 | .00015 | ..... | ..... | Elastic limit. |
| 28,000 | .01150 | .01070 | ..... | ..... | |
| 29,000 | .01240 | .00090 | ..... | ..... | |
| 30,000 | .01350 | .00110 | ..... | ..... | |
| 31,000 | .01440 | .00090 | ..... | ..... | |
| 32,000 | .01615 | .00175 | ..... | ..... | |
| 62,150 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 62,150 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch... | .2800 |
| Elongation per inch under strain at elastic limit | do... | .00080 |
| Reduction in diameter at point of rupture | do... | .125 |
| Reduction in area after rupture, per cent of original section | do... | 43.8 |
| Position of rupture | | 1″.18 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.31*, ″.25 |

## No. 6767.

Marks, $\begin{smallmatrix} A & 23 \\ A & X & 6 \end{smallmatrix}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive Elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00035 | .00030 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30.000 | .00100 | .00040 | ..... | ..... | |
| 35,000 | .00115 | .00015 | ..... | ..... | Elastic limit. |
| | .01600 | .01485 | ..... | ..... | |
| 36,000 | .01740 | .00140 | ..... | ..... | |
| 37,000 | .01850 | .00110 | ..... | ..... | |
| 38,000 | .01955 | .00105 | ..... | ..... | |
| 39,000 | .02100 | .00145 | ..... | ..... | |
| 40,000 | .02300 | .00200 | ..... | ..... | |
| 65,300 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 65,300 |
| Elastic limit per square inch of original section | do... | 35,000 |
| Elongation per inch after rupture | inch.. | .3250 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .175 |
| Reduction in area after rupture, per cent of original section | | 57.2 |
| Position of rupture | | 1″.25 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.28, ″.37 * |

## No. 6901.

Marks, $\frac{A\ 26}{A\ X\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | Elastic limit. |
| 31,000 | .01525 | .01425 | ..... | ..... | |
| 32,000 | .01700 | .00175 | ..... | ..... | |
| 33,000 | .01800 | .00100 | ..... | ..... | |
| 34,000 | .01950 | .00150 | ..... | ..... | |
| 35,000 | .02100 | .00150 | ..... | ..... | |
| 61,200 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 61,200 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .3100 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.30*, ″.32* |

## No. 6902.

Marks, $\frac{A\ 30}{A\ X\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 30,000 | .00095 | .00035 | ..... | ..... | |
| 33,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 34,000 | .01725 | .01625 | ..... | ..... | |
| 35,000 | .01775 | .00050 | ..... | ..... | |
| 36,000 | .01840 | .00065 | ..... | ..... | |
| 37,000 | .02000 | .00160 | ..... | ..... | |
| 38,000 | .02200 | .00200 | ..... | ..... | |
| 64,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 64,100 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .3200 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | 1″.2 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.26, ″.38* |

## No. 6903.

Marks, $\frac{A\ 31}{A\ X\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00030 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00095 | .00035 | ..... | ..... | |
| 31,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 32,000 | .01375 | .01275 | ..... | ..... | |
| 33,000 | .01400 | .00025 | ..... | ..... | |
| 34,000 | .01500 | .00100 | ..... | ..... | |
| 35,000 | .01600 | .00100 | ..... | ..... | |
| 36,000 | .01775 | .00175 | ..... | ..... | |
| 65,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 65,550 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .3000 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.25, ″.35* |

## No. 6923.

Marks, $\begin{matrix} A\ 33 \\ A\ X\ 6 \end{matrix}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00030 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 24,000 | .00085 | .00025 | ..... | ..... | Elastic limit. |
| 25,000 | .00550 | .00465 | ..... | ..... | |
| 26,000 | .00800 | .00250 | ..... | ..... | |
| 27,000 | .01050 | .00250 | ..... | ..... | |
| 28,000 | .01210 | .00160 | ..... | ..... | |
| 29,000 | .01350 | .00140 | ..... | ..... | |
| 59,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 59,100 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .3400 |
| Elongation per inch under strain at elastic limit | do... | .00085 |
| Reduction in diameter at point of rupture | do... | .175 |
| Reduction in area after rupture, per cent of original section | | 57.2 |
| Position of rupture | | 1".2 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ".41*, ".27 |

# PISTON RODS—6-POUNDER GUN MOUNTS.

## STEEL FORGINGS.

## No. 6591.

Marks, $\frac{A\ 26}{P\ R\ 6}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00080 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00080 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 35,000 | .00115 | .00015 | ..... | ..... | Elastic limit. |
| 36,000 | .00400 | .00285 | ..... | ..... | |
| 37,000 | .00630 | .00230 | ..... | ..... | |
| 38,000 | .00700 | .00070 | ..... | ..... | |
| 39,000 | .00745 | .00045 | ..... | ..... | |
| 40,000 | .00800 | .00055 | ..... | ..... | |
| 85,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 85,500 |
| Elastic limit per square inch of original section | do... | 35,000 |
| Elongation per inch after rupture | inch.. | .2250 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | 1".1 from neck |
| Character of broken surface | | silky 60 per cent, granular 40 per cent |
| Elongation of inch sections | | ".25*, ".20 |

## No. 6592.

Marks, $\frac{A\ 27}{P\ R\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 33,000 | .00110 | .00010 | ..... | ..... | |
| 34,000 | .00115 | .00005 | ..... | ..... | Elastic limit. |
| 35,000 | .00600 | .00485 | ..... | ..... | |
| 36,000 | .00655 | .00055 | ..... | ..... | |
| 37,000 | .00710 | .00055 | ..... | ..... | |
| 38,000 | .00795 | .00085 | ..... | ..... | |
| 39,000 | .00890 | .00095 | ..... | ..... | |
| 83,150 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 83,150 |
| Elastic limit per square inch of original section | do... | 34,000 |
| Elongation per inch after rupture | inch.. | .2150 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | 1″. from neck |
| Character of broken surface | | granular 80 per cent, dull silky 20 per cent |
| Elongation of inch sections | | ″.25*, ″.18 |

## No. 6593.

Marks, $\overset{A\ 41}{P\ R\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 34,000 | .00115 | .00015 | ..... | ..... | Elastic limit. |
| 35,000 | .00135 | .00020 | ..... | ..... | |
| 36,000 | .00625 | .00490 | ..... | ..... | |
| 37,000 | .00705 | .00080 | ..... | ..... | |
| 38,000 | .00750 | .00045 | ..... | ..... | |
| 39,000 | .00825 | .00075 | ..... | ..... | |
| 85,400 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 85,400 |
| Elastic limit per square inch of original section | do... | 34,000 |
| Elongation per inch after rupture | inch.. | .2150 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular 70 per cent, dull silky 30 per cent |
| Elongation of inch sections | | ″.22*, ″.21* |

## No. 6594.

Marks, $\begin{matrix} A\ 54 \\ P\ R\ 6 \end{matrix}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00095 | .00035 | ..... | ..... | |
| 34,000 | .00110 | .00015 | ..... | ..... | Elastic limit. |
| 35,000 | .00425 | .00315 | ..... | ..... | |
| 36,000 | .00655 | .00230 | ..... | ..... | |
| 37,000 | .00750 | .00095 | ..... | ..... | |
| 38,000 | .00800 | .00050 | ..... | ..... | |
| 39,000 | .00895 | .00095 | ..... | ..... | |
| 82,400 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 82,400 |
| Elastic limit per square inch of original section | do.... | 34,000 |
| Elongation per inch after rupture | inch.. | .2250 |
| Elongation per inch under strain at elastic limit | do.... | .00110 |
| Reduction in diameter at point of rupture | do.... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | dull silky, with granular spot at circumference |
| Elongation of inch sections | | ".22, ".23* |

# PIVOT SOCKETS—15-POUNDER GUN MOUNTS.

## STEEL CASTINGS.

## No. 6464.

Marks, $\frac{A\ 1}{2\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Appled loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00040 | .00025 | ..... | ..... | |
| 15,000 | .00060 | .00020 | ..... | ..... | |
| 20,000 | .00075 | .00015 | ..... | ..... | |
| 25,000 | .00100 | .00025 | ..... | ..... | |
| 26,000 | .00110 | .00010 | ..... | ..... | Elastic limit. |
| 27,000 | .00145 | .00035 | ..... | ..... | |
| 28,000 | .00175 | .00030 | ..... | ..... | |
| 29,000 | .00235 | .00060 | ..... | ..... | |
| 30,000 | .00350 | .00115 | ..... | ..... | |
| 31,000 | .00450 | .00100 | ..... | ..... | |
| 32,000 | .00510 | .00060 | ..... | ..... | |
| 33,000 | .00560 | .00050 | ..... | ..... | |
| 34,000 | .00640 | .00080 | ..... | ..... | |
| 35,000 | .00700 | .00060 | ..... | ..... | |
| 36,000 | .00760 | .00060 | ..... | ..... | |
| 55,800 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 55,800 |
| Elastic limit per square inch of original section | do... | 26,000 |
| Elongation per inch after rupture | inch.. | .0300 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .005 |
| Reduction in area after rupture, per cent of original section | | 1.8 |
| Position of rupture | | ″.70 from neck |
| Character of broken surface | | granular, dull spot at circumference |
| Elongation of inch sections | | ″.04*, ″.02 |

## No. 6465.

Marks, $\frac{A\ 2}{2\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 15,000 | .00050 | .00025 | ..... | ..... | |
| 18,000 | .00065 | .00015 | ..... | ..... | Elastic limit. |
| 19,000 | .00100 | .00035 | ..... | ..... | |
| 20,000 | .00115 | .00015 | ..... | ..... | |
| 21,000 | .00160 | .00045 | ..... | ..... | |
| 22,000 | .00260 | .00100 | ..... | ..... | |
| 23,000 | .00425 | .00165 | ..... | ..... | |
| 24,000 | .00540 | .00115 | ..... | ..... | |
| 25,000 | .00660 | .00120 | ..... | ..... | |
| 26,000 | .00790 | .00130 | ..... | ..... | |
| 27,000 | .00950 | .00160 | ..... | ..... | |
| 28,000 | .01070 | .00120 | ..... | ..... | |
| 29,000 | .01225 | .00155 | ..... | ..... | |
| 30,000 | .01400 | .00175 | ..... | ..... | |
| 51,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 51,950 |
| Elastic limit per square inch of original section | do... | 18,000 |
| Elongation per inch after rupture | inch.. | .1650 |
| Elongation per inch under strain at elastic limit | do... | .00065 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ″.60 from neck |
| Character of broken surface | | dull silky, trace of granulation |
| Elongation of inch sections | | ″.14, ″.19* |

## No. 6480.

Marks, $\overset{A\ 27}{3\ P\ S\ 15}$.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 15,000 | .00050 | .00020 | ..... | ..... | |
| 20,000 | .00070 | .00020 | ..... | ..... | |
| 25,000 | .00100 | .00030 | ..... | ..... | |
| 26,000 | .00110 | .00010 | ..... | ..... | |
| 27,000 | .00120 | .00010 | ..... | ..... | Elastic limit. |
| 28,000 | .00145 | .00025 | ..... | ..... | |
| 29,000 | .00200 | .00055 | ..... | ..... | |
| 30,000 | .00240 | .00040 | ..... | ..... | |
| 31,000 | .00275 | .00035 | ..... | ..... | |
| 32,000 | .00350 | .00075 | ..... | ..... | |
| 33,000 | .00440 | .00090 | ..... | ..... | |
| 34,000 | .00550 | .00110 | ..... | ..... | |
| 35,000 | .00675 | .00125 | ..... | ..... | |
| 36,000 | .00750 | .00075 | ..... | ..... | |
| 37,000 | .00850 | .00100 | ..... | ..... | |
| 38,000 | .01000 | .00150 | ..... | ..... | |
| 46,300 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 46,300 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .0300 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .015 |
| Reduction in area after rupture, per cent of original section | | 5.7 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular 60 per cent, spongy 40 per cent |
| Elongation of inch sections | | ″.05*, ″.01 |

## No. 6481.

Marks, $\overset{A\ 28}{3\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | 0. | 0. | 0. | ..... | |
| 10,000 | .00020 | .00020 | ..... | ..... | |
| 15,000 | .00040 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00020 | ..... | ..... | |
| 25,000 | .00090 | .00030 | ..... | ..... | |
| 26,000 | .00100 | .00010 | ..... | ..... | |
| 27,000 | .00110 | .00010 | ..... | ..... | Elastic limit. |
| 28,000 | .00160 | .00050 | ..... | ..... | |
| 29,000 | .00190 | .00030 | ..... | ..... | |
| 30,000 | .00250 | .00060 | ..... | ..... | |
| 31,000 | .00300 | .00050 | ..... | ..... | |
| 32,000 | .00390 | .00090 | ..... | ..... | |
| 33,000 | .00490 | .00100 | ..... | ..... | |
| 34,000 | .00615 | .00125 | ..... | ..... | |
| 35,000 | .00730 | .00115 | ..... | ..... | |
| 36,000 | .00850 | .00120 | ..... | ..... | |
| 53,200 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 53,200 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .0550 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .025 |
| Reduction in area after rupture, per cent of original section | | 9.5 |
| Position of rupture | | ″.50 from neck |
| Character of broken surface | | granular 80 per cent, spongy 20 per cent |
| Elongation of inch sections | | ″.04, ″.07* |

## No. 6482.

Marks, $\frac{A\ 30}{2\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 15,000 | .00050 | .00020 | ..... | ..... | |
| 20,000 | .00080 | .00030 | ..... | ..... | Elastic limit. |
| 21,000 | .00120 | .00040 | ..... | ..... | |
| 22,000 | .00140 | .00020 | ..... | ..... | |
| 23,000 | .00190 | .00050 | ..... | ..... | |
| 24,000 | .00475 | .00285 | ..... | ..... | |
| 25,000 | .00650 | .00175 | ..... | ..... | |
| 26,000 | .00830 | .00180 | ..... | ..... | |
| 27,000 | .00950 | .00120 | ..... | ..... | |
| 28,000 | .01100 | .00150 | ..... | ..... | |
| 29,000 | .01200 | .00100 | ..... | ..... | |
| 30,000 | .01415 | .00215 | ..... | ..... | |
| 36,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 36,400 |
| Elastic limit per square inch of original section | do... | 20,000 |
| Elongation per inch after rupture | inch.. | .0800 |
| Elongation per inch under strain at elastic limit | do... | .00080 |
| Position of rupture | | at neck, and at a seam in head |
| Character of broken surface | | granular and silky 50 per cent, seamy 50 per cent |
| Elongation of inch sections | | ″.04, ″.02 |

## No. 6532.

Marks, $\frac{A\ 30}{3\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | ..... | ..... | |
| 10,000 | .00040 | .00030 | ..... | ..... | |
| 15,000 | .00060 | .00020 | ..... | ..... | |
| 20,000 | .00090 | .00030 | .00010 | .00010 | |
| 21,000 | .00095 | .00005 | ..... | ..... | |
| 22,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 23,000 | .00125 | .00025 | ..... | ..... | |
| 24,000 | .00155 | .00030 | ..... | ..... | |
| 25,000 | .00210 | .00055 | ..... | ..... | |
| 26,000 | .00325 | .00115 | ..... | ..... | |
| 27,000 | .00500 | .00175 | ..... | ..... | |
| 28,000 | .00640 | .00140 | ..... | ..... | |
| 29,000 | .00750 | .00110 | ..... | ..... | |
| 30,000 | .00900 | .00150 | ..... | ..... | |
| 49,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 49,600 |
| Elastic limit per square inch of original section | do... | 22,000 |
| Elongation per inch after rupture | inch.. | .0650 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | amorphous, spongy |
| Elongation of inch sections | | ″.03, ″.10* |

## No. 6483.

Marks, $\frac{A\ 31}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 15,000 | .00050 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00015 | ..... | ..... | |
| 25.000 | .00095 | .00030 | ..... | ..... | |
| 26,000 | .00110 | .00015 | ..... | ..... | |
| 27,000 | .00125 | .00015 | ..... | ..... | Elastic limit. |
| 28,000 | .00220 | .00095 | ..... | ..... | |
| 29,000 | .00290 | .00070 | ..... | ..... | |
| 30,000 | .00350 | .00060 | ..... | ..... | |
| 31,000 | .00440 | .00090 | ..... | ..... | |
| 32,000 | .00540 | .00100 | ..... | ..... | |
| 33,000 | .00650 | .00110 | ..... | ..... | |
| 34,000 | .00735 | .00105 | ..... | ..... | |
| 35,000 | .00865 | .00110 | ..... | ..... | |
| 36,000 | .01000 | .00135 | ..... | ..... | |
| 45,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 45,900 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .0350 |
| Elongation per inch under strain at elastic limit | do... | .00125 |
| Reduction in diameter at point of rupture | do... | .015 |
| Reduction in area after rupture, per cent of original section | | 5.7 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | granular 70 per cent, seamy, 30 per cent |
| Elongation of inch sections | | ″.04, ″.03* |

## No. 6632.

Marks, $\overset{A\ 31}{2\ P\ S\ 15}$
Diameter ″.500.
Sectional area, .196 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00055 | .00030 | ..... | ..... | |
| 30,000 | .00090 | .00035 | ..... | ..... | |
| 31,000 | .00095 | .00005 | ..... | ..... | |
| 32,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 33,000 | .00875 | .00775 | ..... | ..... | |
| 34,000 | .00925 | .00050 | ..... | ..... | |
| 35,000 | .00940 | .00015 | ..... | ..... | |
| 36,000 | .01015 | .00075 | ..... | ..... | |
| 37,000 | .01100 | .00085 | ..... | ..... | |
| 74,390 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 74,390 |
| Elastic limit per square inch of original section | do... | 32,000 |
| Elongation per inch after rupture | inch.. | .1350 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .040 |
| Reduction in area after rupture, per cent of original section | | 15.2 |
| Position of rupture | | ″.7 from neck |
| Character of broken surface | | granular, radiating from a silky spot at circumference |
| Elongation of inch sections | | ″.12, ″.15* |

## No. 6451.

Marks, $\frac{A\ 33}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00020 | .00010 | ..... | ..... | |
| 15,000 | .00050 | .00030 | ..... | ..... | |
| 20,000 | .00065 | .00015 | ..... | ..... | |
| 25,000 | .00085 | .00020 | ..... | ..... | |
| 28,000 | .00090 | .00005 | ..... | ..... | |
| 29,000 | .00100 | .00010 | ..... | ..... | |
| 30,000 | .00100 | .0 | ..... | ..... | Elastic limit. |
| 31,000 | .01200 | .01100 | ..... | ..... | |
| 32,000 | .01205 | .00005 | ..... | ..... | |
| 33,000 | .01235 | .00030 | ..... | ..... | |
| 34,000 | .01325 | .00090 | ..... | ..... | |
| 35,000 | .01500 | .00175 | ..... | ..... | |
| 36,000 | .01650 | .00150 | ..... | ..... | |
| 37,000 | .01790 | .00140 | ..... | ..... | |
| 38,000 | .01950 | .00160 | ..... | ..... | |
| 39,000 | .02100 | .00150 | ..... | ..... | |
| 40,000 | .02250 | .00150 | ..... | ..... | |
| 64,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 64,950 |
| Elastic limit per square inch of orignal section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .3150 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of orignal section | | 46.2 |
| Position of rupture | | 1″.45 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.27, ″.36* |

## No. 6452.

Marks, $\frac{A\ 34}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00015 | .00005 | ..... | ..... | |
| 15,000 | .00030 | .00015 | ..... | ..... | |
| 20,000 | .00050 | .00020 | ..... | ..... | |
| 25,000 | .00065 | .00015 | ..... | ..... | |
| 30,000 | .00085 | .00020 | ..... | ..... | |
| 32,000 | .00095 | .00010 | ..... | ..... | |
| 34,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 35,000 | .00745 | .00645 | ..... | ..... | |
| 36,000 | .00810 | .00065 | ..... | ..... | |
| 37,000 | .00860 | .00050 | ..... | ..... | |
| 38,000 | .00950 | .00090 | ..... | ..... | |
| 39,000 | .01050 | .00100 | ..... | ..... | |
| 40,000 | .01155 | .00105 | ..... | ..... | |
| 41,000 | .01225 | .00070 | ..... | ..... | |
| 42,000 | .01350 | .00125 | ..... | ..... | |
| 43,000 | .01450 | .00100 | ..... | ..... | |
| 73,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds... | 73,400 |
| Elastic limit per square inch of original section | do... | 34,000 |
| Elongation per inch after rupture | inch.. | .1550 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.60 from neck |
| Character of broken surface | | fine granular 80 per cent, dull silky 20 per cent |
| Elongation of inch sections | | ″.16*, ″.15 |

## No. 6484.

Marks, $\frac{A\ 35}{PS\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | 0. | C. | ..... | ..... | |
| 10,000 | .00015 | .00015 | ..... | ..... | |
| 15,000 | .00040 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00020 | ..... | ..... | |
| 25,000 | .00075 | .00015 | ..... | ..... | |
| 26,000 | .00085 | .00010 | ..... | ..... | |
| 27,000 | .00090 | .00005 | ..... | ..... | |
| 28,000 | .00095 | .00005 | ..... | ..... | Elastic limit. |
| 29,000 | .01100 | .01005 | ..... | ..... | |
| 30,000 | .01150 | .00050 | ..... | ..... | |
| 31,000 | .01225 | .00075 | ..... | ..... | |
| 32,000 | .01350 | .00125 | ..... | ..... | |
| 33,000 | .01500 | .00150 | ..... | ..... | |
| 34,000 | .01600 | .00100 | ..... | ..... | |
| 35,000 | .01775 | .00175 | ..... | ..... | |
| 36,000 | .01950 | .00175 | ..... | ..... | |
| 37,000 | .02140 | .00190 | ..... | ..... | |
| 38,000 | .02350 | .00210 | ..... | ..... | |
| 61,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 61,450 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .2700 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction of diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | ″.50 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.32*, ″.20 |

## No. 6485.

Marks, $\frac{A\ 36}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | ..... | ..... | |
| 10,000 | .00020 | .00010 | ..... | ..... | |
| 15,000 | .00045 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00020 | ..... | ..... | |
| 22,000 | .00075 | .00010 | ..... | ..... | |
| 23,000 | .00085 | .00010 | ..... | ..... | |
| 24,000 | .00095 | .00010 | ..... | ..... | |
| 25,000 | .00110 | .00015 | ..... | ..... | Elastic limit. |
| 26,000 | .00165 | .00055 | ..... | ..... | |
| 27,000 | .00190 | .00025 | ..... | ..... | |
| 28,000 | .00265 | .00075 | ..... | ..... | |
| 29,000 | .00360 | .00095 | ..... | ..... | |
| 30,000 | .00460 | .00100 | ..... | ..... | |
| 31,000 | .00595 | .00135 | ..... | ..... | |
| 32,000 | .00695 | .00100 | ..... | ..... | |
| 33,000 | .00815 | .00120 | ..... | ..... | |
| 34,000 | .00910 | .00095 | ..... | ..... | |
| 62,900 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 62,900 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .1500 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 28.9 |
| Position of rupture | | ″.25 from neck |
| Character of broken surface | | silky, trace of granulation |
| Elongation of inch sections | | ″.18*, ″.12 |

## No. 6486.

Marks, $\frac{A\ 87}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00040 | .00025 | ..... | ..... | |
| 15,000 | .00055 | .00015 | ..... | ..... | |
| 20,000 | .00090 | .00035 | ..... | ..... | |
| 21,000 | .00100 | .00010 | ..... | ..... | |
| 22,000 | .00115 | .00015 | ..... | ..... | Elastic limit. |
| 23,000 | .00160 | .00045 | ..... | ..... | |
| 24,000 | .00190 | .00030 | ..... | ..... | |
| 25,000 | .00225 | .00035 | ..... | ..... | |
| 26,000 | .00300 | .00075 | ..... | ..... | |
| 27,000 | .00400 | .00100 | ..... | ..... | |
| 28,000 | .00475 | .00075 | ..... | ..... | |
| 29,000 | .00575 | .00100 | ..... | ..... | |
| 30,000 | .00700 | .00125 | ..... | ..... | |
| 31,000 | .00760 | .00060 | ..... | ..... | |
| 32,000 | .00900 | .00140 | ..... | ..... | |
| 62,000 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 62,000 |
| Elastic limit per square inch of original section | do... | 22,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.20*, ″.16 |

## No. 6513.

Marks, $\frac{A\ 38}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00045 | .00035 | ..... | ..... | |
| 15,000 | .00065 | .00020 | ..... | ..... | |
| 18,000 | .00085 | .00020 | ..... | ..... | Elastic limit. |
| 20,000 | .00105 | .00020 | .00045 | .00045 | |
| 21,000 | .00135 | .00030 | ..... | ..... | |
| 22,000 | .00160 | .00025 | ..... | ..... | |
| 23,000 | .00195 | .00035 | ..... | ..... | |
| 24,000 | .00295 | .00100 | ..... | ..... | |
| 25,000 | .00355 | .00060 | ..... | ..... | |
| 26,000 | .00455 | .00100 | ..... | ..... | |
| 27,000 | .00560 | .00105 | ..... | ..... | |
| 28,000 | .00630 | .00070 | ..... | ..... | |
| 29,000 | .00750 | .00120 | ..... | ..... | |
| 30,000 | .00875 | .00125 | ..... | ..... | |
| 58,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 58,500 |
| Elastic limit per square inch of original section | do... | 18,000 |
| Elongation per inch after rupture | inch.. | .2500 |
| Elongation per inch under strain at elastic limit | do... | .00085 |
| Reduction in diameter at point of rupture | do... | .105 |
| Reduction in area after rupture, per cent of original section | | 87.1 |
| Position of rupture | | ″.45 from neck |
| Character of broken surface | | silky, granular at center |
| Elongation of inch sections | | ″.16, ″.34* |

## No. 6487.

Marks, $\frac{A\ 39}{P\ S\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | ..... | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 15,000 | .00045 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00020 | ..... | ..... | |
| 21,000 | .00075 | .00010 | ..... | ..... | |
| 22,000 | .00090 | .00015 | ..... | ..... | Elastic limit. |
| 23,000 | .00160 | .00070 | ..... | ..... | |
| 24,000 | .00225 | .00065 | ..... | ..... | |
| 25,000 | .00330 | .00105 | ..... | ..... | |
| 26,000 | .00435 | .00105 | ..... | ..... | |
| 27,000 | .00500 | .00065 | ..... | ..... | |
| 28,000 | .00590 | .00090 | ..... | ..... | |
| 29,000 | .00670 | .00080 | ..... | ..... | |
| 30,000 | .00760 | .00090 | ..... | ..... | |
| 31,000 | .00875 | .00115 | ..... | ..... | |
| 32,000 | .00960 | .00085 | ..... | ..... | |
| 66,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,000 |
| Elastic limit per square inch of original section | do... | 22,000 |
| Elongation per inch after rupture | inch.. | .2250 |
| Elongation per inch under strain at elastic limit | do... | .00090 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | ".80 from neck |
| Character of broken surface | | granular, dull spot at circumference |
| Elongation of inch sections | | ".24*, ".21 |

## No. 6488.

Marks, $\frac{A\ 40}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00030 | .00015 | ..... | ..... | |
| 15,000 | .00050 | .00020 | ..... | ..... | |
| 17,000 | .00060 | .00010 | ..... | ..... | |
| 18,000 | .00065 | .00005 | ..... | ..... | |
| 19,000 | .00070 | .00005 | ..... | ..... | Elastic limit. |
| 20,000 | .00105 | .00035 | ..... | ..... | |
| 21,000 | .00145 | .00040 | ..... | ..... | |
| 22,000 | .00175 | .00030 | ..... | ..... | |
| 23,000 | .00285 | .00110 | ..... | ..... | |
| 24,000 | .00410 | .00125 | ..... | ..... | |
| 25,000 | .00560 | .00150 | ..... | ..... | |
| 26,000 | .00690 | .00130 | ..... | ..... | |
| 27,000 | .00755 | .00065 | ..... | ..... | |
| 28,000 | .00875 | .00120 | ..... | ..... | |
| 29,000 | .00980 | .00105 | ..... | ..... | |
| 30,000 | .01125 | .00145 | ..... | ..... | |
| 58,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 58,900 |
| Elastic limit per square inch of original section | do... | 19,000 |
| Elongation per inch after rupture | inch.. | .2600 |
| Elongation per inch under strain at elastic limit | do... | .00070 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 80.7 |
| Position of rupture | | ″.65 from neck |
| Character of broken surface | | silky 80 per cent, granular 20 per cent |
| Elongation of inch sections | | ″.20, ″.32* |

## No. 6516.

Marks, $\frac{A\ 40}{2\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 15,000 | .00050 | .00015 | ..... | ..... | |
| 19,000 | .00060 | .00010 | ..... | ..... | Elastic limit. |
| 20,000 | .00080 | .00020 | .00015 | .00015 | |
| 21,000 | .00100 | .00020 | ..... | ..... | |
| 22,000 | .00120 | .00020 | ..... | ..... | |
| 23,000 | .00160 | .00040 | ..... | ..... | |
| 24,000 | .00300 | .00140 | ..... | ..... | |
| 25,000 | .00500 | .00200 | ..... | ..... | |
| 26,000 | .00635 | .00135 | ..... | ..... | |
| 27,000 | .00760 | .00125 | ..... | ..... | |
| 28,000 | .00865 | .00105 | ..... | ..... | |
| 60,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 60,400 |
| Elastic limit per square inch of original section | do... | 19,000 |
| Elongation per inch after rupture | inch.. | .2500 |
| Elongation per inch under strain at elastic limit | do... | .00060 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 34.0 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.22, ″.28* |

## No. 6645.

Marks, $\frac{A\ 40}{S\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00040 | .00030 | ..... | ..... | |
| 20,000 | .00070 | .00030 | ..... | ..... | |
| 26,000 | .00100 | .00030 | ..... | ..... | Elastic limit. |
| 27,000 | .00125 | .00025 | ..... | ..... | |
| 28,000 | 00400 | .00275 | ..... | ..... | |
| 29,000 | .00800 | .00400 | ..... | ..... | |
| 30,000 | .01050 | .00250 | ..... | ..... | |
| 31,000 | .01250 | .00200 | ..... | ..... | |
| 48,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 48,000 |
| Elastic limit per square inch of original section | do... | 26,000 |
| Elongation per inch after rupture | inch.. | .0600 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .025 |
| Reduction in area after rupture, per cent of original section | do... | 9.5 |
| Position of rupture | | ″.40 from neck |
| Character of broken surface | | dull amorphous, spongy |
| Elongation of inch sections | | ″.09*, ″.08 |

## No. 6514.

Marks, $\frac{A\ 41}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 15,000 | .00050 | .00015 | ..... | ..... | |
| 20,000 | .00065 | .00015 | 0. | ..... | |
| 25,000 | .00085 | .00020 | ..... | ..... | |
| 28,000 | .00100 | .00015 | ..... | ..... | |
| 29,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 30,000 | .00675 | .00570 | ..... | ..... | |
| 31,000 | .00950 | .00275 | ..... | ..... | |
| 32,000 | .01105 | .00155 | ..... | ..... | |
| 33,000 | .01190 | .00085 | ..... | ..... | |
| 34,000 | .01300 | .00110 | ..... | ..... | |
| 35,000 | .01425 | .00125 | ..... | ..... | |
| 65,150 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 65,150 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .2250 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | dull silky |
| Elongation of inch sections | | ″.23*,″.22* |

## No. 6515.

Marks, $\frac{A\ 42}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 15,000 | .00035 | .00010 | ..... | ..... | |
| 20,000 | .00060 | .00025 | 0. | ..... | Elastic limit. |
| 21,000 | .00065 | .00025 | ..... | ..... | |
| 22,000 | .00130 | .00045 | ..... | ..... | |
| 23,000 | .00220 | .00090 | ..... | ..... | |
| 24,000 | .00350 | .00130 | ..... | ..... | |
| 25,000 | .00455 | .00105 | ..... | ..... | |
| 60,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 60,100 |
| Elastic limit per square inch of original section | do... | 20,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00060 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | granular, dull flaky spot at circumference |
| Elongation of inch sections | | ″.17, ″.19* |

## No. 6533.

Marks, $\frac{A\ 43}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 15,000 | .00050 | .00015 | ..... | ..... | |
| 20,000 | .00070 | .00020 | 0. | ..... | |
| 25,000 | .00090 | .00020 | ..... | ..... | |
| 30,000 | .00105 | .00015 | ..... | ..... | |
| 31,000 | .00110 | .00005 | ..... | ..... | |
| 32,000 | .00115 | .00005 | ..... | ..... | Elastic limit. |
| 33,000 | .00185 | .00020 | ..... | ..... | |
| | .00950 | .00815 | ..... | ..... | |
| 34,000 | .01090 | .00140 | ..... | ..... | |
| 35,000 | .01150 | .00060 | ..... | ..... | |
| 68,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,550 |
| Elastic limit per square inch of original section | do... | 32,000 |
| Elongation per inch after rupture | inch.. | .2200 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | dull amorphous, in part granular |
| Elongation of inch sections | | ″.25*, ″.19 |

## No. 6570.

Marks, $\frac{A\ 44}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00075 | .00040 | ..... | ..... | |
| 25,000 | .00090 | .00015 | ..... | ..... | |
| 26,000 | .00095 | .00005 | ..... | ..... | |
| 27,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 28,000 | .00135 | .00035 | ..... | ..... | |
| 29,000 | .00285 | .00150 | ..... | ..... | |
| 30,000 | .00550 | .00265 | ..... | ..... | |
| 31,000 | .00690 | .00140 | ..... | ..... | |
| 32,000 | .00750 | .00060 | ..... | ..... | |
| 69,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,550 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .2450 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | granular 70 per cent, dull silky 30 per cent |
| Elongation of inch sections | | ″.21, ″.28* |

## No. 6595.

Marks, $\frac{A\ 45}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 23,000 | .00075 | .00015 | ..... | ..... | Elastic limit. |
| 24,000 | .00095 | .00020 | ..... | ..... | |
| 25,000 | .00100 | .00005 | ..... | ..... | |
| 26,000 | .00110 | .00010 | ..... | ..... | |
| 27,000 | .00145 | .00035 | ..... | ..... | |
| 28,000 | .00690 | .00545 | ..... | ..... | |
| 29,000 | .00810 | .00120 | ..... | ..... | |
| 30,000 | .00925 | .00115 | ..... | ..... | |
| 62,550 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 62,550 |
| Elastic limit per square inch of original section | do... | 23,000 |
| Elongation per inch after rupture | inch.. | .2550 |
| Elongation per inch under strain at elastic limit | do... | .00075 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | dull gray, amorphous |
| Elongation of inch sections | | ″.27*, ″.24 |

## No. 6534.

Marks, $\frac{A\ 46}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 26,000 | .00080 | .00015 | ..... | ..... | |
| 27,000 | .00085 | .00005 | ..... | ..... | |
| 28,000 | .00090 | .00005 | ..... | ..... | |
| 29,000 | .00100 | .00010 | ..... | ..... | Elastic limit. |
| 30,000 | .00200 | .00100 | ..... | ..... | |
| 31,000 | .00305 | .00105 | ..... | ..... | |
| 32,000 | .00375 | .00070 | ..... | ..... | |
| 33,000 | .00415 | .00040 | ..... | ..... | |
| 34,000 | .00550 | .00135 | ..... | ..... | |
| 70,100 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,100 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.4 from neck |
| Character of broken surface | | granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.15, ″.21* |

## No. 6535.

Marks, $\frac{A\ 47}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 21,000 | .00075 | .00010 | ..... | ..... | |
| 22,000 | .00080 | .00005 | ..... | ..... | |
| 23,000 | .00085 | .00005 | ..... | ..... | Elastic limit. |
| 24,000 | .00115 | .00030 | ..... | ..... | |
| 25,000 | .00260 | .00145 | ..... | ..... | |
| 26,000 | .00350 | .00090 | ..... | ..... | |
| 27,000 | .00455 | .00105 | ..... | ..... | |
| 28,000 | .00550 | .00095 | ..... | ..... | |
| 60,500 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 60,500 |
| Elastic limit per square inch of original section | do... | 23,000 |
| Elongation per inch after rupture | inch.. | .2200 |
| Elongation per inch under strain at elastic limit | do... | .00085 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | dull amorphous 70 per cent, granular 30 per cent |
| Elongation of inch sections | | ″.25*, ″.19 |

## No. 6571.

Marks, $\frac{A\ 42}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | ..... | ..... | |
| 10,000 | .00040 | .00030 | ..... | ..... | |
| 20,000 | .00075 | .00035 | ..... | ..... | |
| 23,000 | .00085 | .00010 | ..... | ..... | |
| 24,000 | .00090 | .00005 | ..... | ..... | |
| 25,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 26,000 | .00150 | .00045 | ..... | ..... | |
| 27,000 | .00205 | .00055 | ..... | ..... | |
| 28,000 | .00295 | .00090 | ..... | ..... | |
| 29,000 | .00355 | .00060 | ..... | ..... | |
| 30,000 | .00440 | .00085 | ..... | ..... | |
| 69,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,450 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .1950 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.20*, ″.19* |

## No. 6572.

Marks, $\frac{A\ 49}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00040 | .00025 | ..... | ..... | |
| 15,000 | .00080 | .00040 | .00015 | .00015 | |
| 20,000 | .00095 | .00015 | ..... | ..... | |
| 21,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 22,000 | .00120 | .00020 | ..... | ..... | |
| 23,000 | .00135 | .00015 | ..... | ..... | |
| 24,000 | .00150 | .00015 | ..... | ..... | |
| 25,000 | .00195 | .00045 | ..... | ..... | |
| 26,000 | .00310 | .00015 | ..... | ..... | |
| 27,000 | .00405 | .00095 | ..... | ..... | |
| 28,000 | .00550 | .00145 | ..... | ..... | |
| 64,800 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 64,800 |
| Elastic limit per square inch of original section | do... | 21,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular 60 per cent, dull silky 40 per cent |
| Elongation of inch sections | | ″.20*, ″.18 |

## No. 6536.

Marks, $\frac{A\ 50}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loans per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 25,000 | .00090 | .00030 | ..... | ..... | |
| 26,000 | .00100 | .00010 | ..... | ..... | Elastic limit. |
| 27,000 | .00125 | .00025 | ..... | ..... | |
| 28,000 | .00150 | .00025 | ..... | ..... | |
| 29,000 | .00200 | .00050 | ..... | ..... | |
| 30,000 | .00290 | .00090 | ..... | ..... | |
| 31,000 | .00350 | .00060 | ..... | ..... | |
| 32,000 | .00425 | .00075 | ..... | ..... | |
| 71,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,500 |
| Elastic limit per square inch of original section | do... | 26,000 |
| Elongation per inch after rupture | inch.. | .1600 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.85 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.15, ″.17* |

## No. 6537.

**Marks,** $\frac{A\ 51}{P\ S\ 15}$
**Diameter, ".505.**
**Sectional area, .20 square inch.**
**Gauged length, 2".**

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 23,000 | .00075 | .00015 | ..... | ..... | |
| 24,000 | .00085 | .00010 | ..... | ..... | Elastic limit. |
| 25,000 | .00105 | .00020 | .00035 | .00035 | |
| 26,000 | .00150 | .00045 | ..... | ..... | |
| 27,000 | .00225 | .00075 | ..... | ..... | |
| 28,000 | .00375 | .00150 | ..... | ..... | |
| 29,000 | .00475 | .00100 | ..... | ..... | |
| 30,000 | .00575 | .00100 | ..... | ..... | |
| 64,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 64,450 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .1950 |
| Elongation per inch under strain at elastic limit | do... | .00085 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ".8 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ".17, ".22* |

## No. 6538.

Marks, $\frac{A\ 52}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 21,000 | .00075 | .00010 | ..... | ..... | |
| 22,000 | .00080 | .00005 | ..... | ..... | |
| 23,000 | .00085 | .00005 | ..... | ..... | Elastic limit. |
| 24,000 | .00125 | .00040 | ..... | ..... | |
| 25,000 | .00150 | .00125 | ..... | ..... | |
| 26,000 | .00210 | .00060 | ..... | ..... | |
| 27,000 | .00295 | .00085 | ..... | ..... | |
| 28,000 | .00360 | .00065 | ..... | ..... | |
| 29,000 | .00455 | .00095 | ..... | ..... | |
| 30,000 | .00580 | .00125 | ..... | ..... | |
| 61,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 61,550 |
| Elastic limit per square inch of original section | do... | 23,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .00085 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 28.9 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | dull amorphous 80 per cent, granular 20 per cent |
| Elongation of inch sections | | ″.18, ″.20* |

## No. 6539.

Marks, $\frac{A\ 53}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00070 | .00085 | ..... | ..... | |
| 25,000 | .00095 | .00025 | ..... | ..... | Elastic limit. |
| 26,000 | .00120 | .00025 | ..... | ..... | |
| 27,000 | .00145 | .00025 | ..... | ..... | |
| 28,000 | .00215 | .00070 | ..... | ..... | |
| 29,000 | .00260 | .00045 | ..... | ..... | |
| 30,000 | .00340 | .00080 | ..... | ..... | |
| 70,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,050 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .1850 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.6 from neck |
| Character of broken surface | | dull amorphous, granular at the circumference |
| Elongation of inch sections | | ″.16, ″.21* |

## No. 6540.

Marks, $\frac{A\ 54}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 22,000 | .00070 | .00005 | ..... | ..... | |
| 23,000 | .00075 | .00005 | ..... | ..... | |
| 24,000 | .00080 | .00005 | ..... | ..... | |
| 25,000 | .00085 | .00005 | ..... | ..... | Elastic limit. |
| 26,000 | .00125 | .00040 | ..... | ..... | |
| 27,000 | .00200 | .00075 | ..... | ..... | |
| 28,000 | .00295 | .00095 | ..... | ..... | |
| 29,000 | .00335 | .00040 | ..... | ..... | |
| 30,000 | .00415 | .00080 | ..... | ..... | |
| 68,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,550 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00085 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.8 from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.15, ″.21* |

## No. 6541.

Marks, $\frac{A\ 55}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 27,000 | .00085 | .00025 | ..... | ..... | Elastic limit. |
| 28,000 | .00115 | .00030 | ..... | ..... | |
| 29,000 | .00150 | .00035 | ..... | ..... | |
| 30,000 | .00210 | .00060 | ..... | ..... | |
| 31,000 | .00265 | .00055 | ..... | ..... | |
| 32,000 | .00325 | .00060 | ..... | ..... | |
| 33,000 | .00405 | .00080 | ..... | ..... | |
| 34,000 | .00490 | .00085 | ..... | ..... | |
| 35,000 | .00575 | .00085 | ..... | ..... | |
| 70,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,050 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .1700 |
| Elongation per inch under strain at elastic limit | do... | .00085 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.8 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.16, ″.18* |

## No. 6542.

Marks, $\frac{A\ 56}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00050 | .00040 | ..... | ..... | |
| 20,000 | .00085 | .00035 | ..... | ..... | |
| 25,000 | .00110 | .00025 | ..... | ..... | Elastic limit. |
| 26,000 | .00135 | .00025 | ..... | ..... | |
| 27,000 | .00180 | .00045 | ..... | ..... | |
| 28,000 | .00205 | .00025 | ..... | ..... | |
| 29,000 | .00260 | .00055 | ..... | ..... | |
| 30,000 | .00350 | .00090 | ..... | ..... | |
| 73,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 73,000 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .1550 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.5 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.14, ″.17* |

## No. 6633.

Marks, $\frac{A\ 56}{2\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00020 | .00020 | 0. | ..... | |
| 10,000 | .00040 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00025 | ..... | ..... | |
| 30,000 | .00100 | .00035 | 0. | ..... | |
| 35,000 | .00125 | .00025 | ..... | ..... | Elastic limit. |
| | .01050 | .00925 | ..... | ..... | |
| 36,000 | .01115 | .00065 | ..... | ..... | |
| 37,000 | .01200 | .00085 | ..... | ..... | |
| 38,000 | .01300 | .00100 | ..... | ..... | |
| 39,000 | .01425 | .00125 | ..... | ..... | |
| 40,000 | .01600 | .00125 | ..... | ..... | |
| 72,350 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,350 |
| Elastic limit per square inch of original section | do... | 35,000 |
| Elongation per inch after rupture | inch.. | .2050 |
| Elongation per inch under strain at elastic limit | do... | .00125 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | granular 60 per cent; silky 40 per cent |
| Elongation of inch sections | | ″.19, ″.22* |

## No. 6543.

Marks, $\frac{A\ 57}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00040 | .00030 | ..... | ..... | |
| 20,000 | .00075 | .00035 | ..... | ..... | |
| 24,000 | .00090 | .00015 | ..... | ..... | Elastic limit. |
| 25,000 | .00150 | .00060 | ..... | ..... | |
| 26,000 | .00205 | .00055 | ..... | ..... | |
| 27,000 | .00280 | .00075 | ..... | ..... | |
| 28,000 | .00350 | .00070 | ..... | ..... | |
| 29,000 | .00450 | .00100 | ..... | ..... | |
| 30,000 | .00535 | .00085 | ..... | ..... | |
| 65,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 65,400 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .00090 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ″.7 from neck |
| Character of broken surface | | dull amorphous, with granular metal interspersed |
| Elongation of inch sections | | ″.26, ″.12 |

## No. 6544.

Marks, $\frac{A\ 58}{P\ S\ 15}$.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 25,000 | .00095 | .00030 | ..... | ..... | |
| 26,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 27,000 | .00125 | .00025 | ..... | ..... | |
| 28,000 | .00155 | .00030 | ..... | ..... | |
| 29,000 | .00200 | .00045 | ..... | ..... | |
| 30,000 | .00260 | .00060 | ..... | ..... | |
| 31,000 | .00345 | .00085 | ..... | ..... | |
| 32,000 | .00415 | .00070 | ..... | ..... | |
| 72,100 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,100 |
| Elastic limit per square inch of original section | do... | 26,000 |
| Elongation per inch after rupture | inch.. | .1700 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.04 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.18*, ″.16 |

## No. 6545.

Marks, $\overset{A\ 59}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00040 | .00030 | ..... | ..... | |
| 20,000 | .00075 | .00035 | ..... | ..... | |
| 25,000 | .00095 | .00020 | ..... | ..... | |
| 26,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 27,000 | .00140 | .00040 | ..... | ..... | |
| 28,000 | .00200 | .00060 | ..... | ..... | |
| 29,000 | .00255 | .00055 | ..... | ..... | |
| 30,000 | .00345 | .00090 | ..... | ..... | |
| 31,000 | .00425 | .00080 | ..... | ..... | |
| 32,000 | .00485 | .00060 | ..... | ..... | |
| 72,000 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,000 |
| Elastic limit per square inch of original section | do... | 26,000 |
| Elongation per inch after rupture | inch.. | .1550 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.65 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.14, ″.17* |

## No. 6634.

Marks, $\frac{A\ 59}{2\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00045 | .00015 | ..... | ..... | |
| 30,000 | .00090 | .00045 | 0. | ..... | |
| 31,000 | .00095 | .00005 | ..... | ..... | Elastic limit. |
| 32,000 | .00150 | .00055 | ..... | ..... | |
| 33,000 | .00300 | .00150 | ..... | ..... | |
| 34,000 | .00850 | .00550 | ..... | ..... | |
| 35,000 | .00925 | .00075 | ..... | ..... | |
| 36,000 | .01050 | .00125 | ..... | ..... | |
| 72,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,050 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .1850 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | ″.70 from neck |
| Character of broken surface | | granular 60 per cent, dull silky 40 per cent |
| Elongation of inch sections | | ″.16, ″.21* |

## No. 6546.

Marks, $\overset{A\ 60}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00040 | .00030 | ..... | ..... | |
| 15,000 | .00055 | .00015 | ..... | ..... | |
| 18,000 | .00070 | .00015 | ..... | ..... | |
| 19,000 | .00075 | .00005 | ..... | ..... | Elastic limit. |
| 20,000 | .00095 | .00020 | ..... | ..... | |
| 21,000 | .00150 | .00055 | ..... | ..... | |
| 22,000 | .00215 | .00065 | ..... | ..... | |
| 23,000 | .00295 | .00080 | ..... | ..... | |
| 24,000 | .00440 | .00145 | ..... | ..... | |
| 25,000 | .00585 | .00095 | ..... | ..... | |
| 56,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 56,000 |
| Elastic limit per square inch of original section | do... | 19,000 |
| Elongation per inch after rupture | inch.. | .2600 |
| Elongation per inch under strain at elastic limit | do... | .00075 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | dull amorphous |
| Elongation of inch sections | | ″.29*, ″.23 |

## No. 6635.

Marks, $\frac{A\ 60}{2\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | ..... | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00080 | .00045 | ..... | ..... | Elastic limit. |
| 21,000 | .00135 | .00055 | ..... | ..... | |
| 22,000 | .00200 | .00065 | ..... | ..... | |
| 23,000 | .00375 | .00175 | ..... | ..... | |
| 24,000 | .00575 | .00200 | ..... | ..... | |
| 25,000 | .00750 | .00175 | ..... | ..... | |
| 55,200 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 55,200 |
| Elastic limit per square inch of original section | do... | 20,000 |
| Elongation per inch after rupture | inch.. | .2800 |
| Elongation per inch under strain at elastic limit | do... | .00080 |
| Reduction in diameter at point of rupture | do... | .115 |
| Reduction in area after rupture, per cent of original section | | 40.3 |
| Position of rupture | | ″.50 from neck |
| Character of broken surface | | dull silky, trace of granulation |
| Elongation of inch sections | | ″.20, ″.36* |

## No. 6547.

Marks, $\frac{A\ 61}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00040 | .00030 | ..... | ..... | |
| 20,000 | .00075 | .00035 | ..... | ..... | |
| 25,000 | .00105 | .00030 | ..... | ..... | Elastic limit. |
| 26,000 | .00135 | .00030 | ..... | ..... | |
| 27,000 | .00190 | .00055 | ..... | ..... | |
| 28,000 | .00245 | .00055 | ..... | ..... | |
| 29,000 | .00300 | .00055 | ..... | ..... | |
| 30,000 | .00395 | .00095 | ..... | ..... | |
| 68,800 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,800 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | 1″. from neck |
| Character of broken surface | | granular 50 per cent, dull amorphous 50 per cent |
| Elongation of inch sections | | ″.16, ″.20* |

## No. 6548.

Marks, $\frac{A\ 62}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 22,000 | .00065 | .00005 | ..... | ..... | |
| 23,000 | .00075 | .00010 | ..... | ..... | Elastic limit. |
| 24,000 | .00090 | .00015 | ..... | ..... | |
| 25,000 | .00105 | .00015 | ..... | ..... | |
| 26,000 | .00145 | .00040 | ..... | ..... | |
| 27,000 | .00180 | .00035 | ..... | ..... | |
| 28,000 | .00215 | .00035 | ..... | ..... | |
| 29,000 | .00305 | .00090 | ..... | ..... | |
| 30,000 | .00400 | .00095 | ..... | ..... | |
| 69,850 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,850 |
| Elastic limit per square inch of original section | do... | 23,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .00075 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ″.18, ″.20* |

## No. 6549.

Marks, $\frac{A\ 63}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 15,000 | .00055 | .00020 | ..... | ..... | |
| 18,000 | .00070 | .00015 | ..... | ..... | |
| 19,000 | .00080 | .00010 | ..... | ..... | Elastic limit. |
| 20,000 | .00255 | .00175 | ..... | ..... | |
| 21,000 | .00425 | .00170 | ..... | ..... | |
| 22,000 | .00575 | .00150 | ..... | ..... | |
| 23,000 | .00700 | .00125 | ..... | ..... | |
| 24,000 | .00825 | .00125 | ..... | ..... | |
| 25,000 | .01000 | .00175 | ..... | ..... | |
| 50,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 50,900 |
| Elastic limit per square inch of original section | do... | 19,000 |
| Elongation per inch after rupture | inch.. | .21000 |
| Elongation per inch under strain at elastic limit | do... | .00080 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | dull amorphous 80 per cent, coarse granular 20 per cent |
| Elongation of inch sections | | ″.23, ″.19 |

## No. 6636.

Marks, $\frac{A\ 63}{2\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 18,000 | .00060 | .00025 | ..... | ..... | |
| 19,000 | .00070 | .00010 | ..... | ..... | Elastic limit. |
| 20,000 | .00280 | .00210 | ..... | ..... | |
| 21,000 | .00500 | .00220 | ..... | ..... | |
| 22,000 | .00675 | .00175 | ..... | ..... | |
| 23,000 | .00815 | .00140 | ..... | ..... | |
| 24,000 | .00975 | .00160 | ..... | ..... | |
| 51,550 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 51,550 |
| Elastic limit per square inch of original section | do... | 19,000 |
| Elongation per inch after rupture | inch.. | .2550 |
| Elongation per inch under strain at elastic limit | do... | .00070 |
| Reduction in diameter at point of rupture | do... | .105 |
| Reduction in area after rupture, per cent of original section | | 37.1 |
| Position of rupture | | ″.50 from neck |
| Character of broken surface | | dull silky, trace of granulation |
| Elongation of inch sections | | ″.82*, ″.19 |

## No. 6573.

Marks, $\frac{A\ 64}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 35,000 | .00125 | .00025 | ..... | ..... | Elastic limit. |
| 36,000 | .01200 | .01075 | ..... | ..... | |
| 37,000 | .01325 | .00125 | ..... | ..... | |
| 38,000 | .01425 | .00100 | ..... | ..... | |
| 39,000 | .01550 | .00125 | ..... | ..... | |
| 40,000 | .01700 | .00150 | ..... | ..... | |
| 68,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,100 |
| Elastic limit per square inch of original section .. | do... | 35,000 |
| Elongation per inch after rupture | inch.. | .2250 |
| Elongation per inch under strain at elastic limit | do... | .00125 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | dull silky |
| Elongation of inch sections | | ″.24*, ″.21 |

## No. 6574.

Marks, $\frac{A\ 65.}{P\ S\ 15.}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| 25,000 | .00100 | .00030 | ..... | ..... | Elastic limit. |
| 26,000 | .00115 | .00015 | ..... | ..... | |
| 27,000 | 00140 | .00025 | ..... | ..... | |
| 28,000 | .00190 | .00050 | ..... | ..... | |
| 29,000 | .00575 | .00385 | ..... | ..... | |
| 30,000 | .00700 | .00125 | ..... | ..... | |
| 31,000 | .00850 | .00150 | ..... | ..... | |
| 65,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 65,900 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .2150 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | granular 20 per cent, dull amorphous 80 per cent |
| Elongation of inch sections | | ″.24*, ″.19 |

## No. 6596.

Marks, $\frac{A\ 66}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 35,000 | .00130 | .00030 | ..... | ..... | Elastic limit. |
| 36,000 | .01560 | .01430 | ..... | ..... | |
| 37,000 | .01605 | .00045 | ..... | ..... | |
| 38,000 | .01650 | .00045 | ..... | ..... | |
| 39,000 | .01775 | .00125 | ..... | ..... | |
| 40,000 | .01900 | .00125 | ..... | ..... | |
| 67,350 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 67,350 |
| Elastic limit per square inch of original section | do... | 35,000 |
| Elongation per inch after rupture | inch.. | .2150 |
| Elongation per inch under strain at elastic limit | do... | .00130 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | ″.6 from neck |
| Character of broken surface | | gray, amorphous |
| Elongation of inch sections | | ″.20, ″.23* |

## No. 6597.

Marks, $\frac{A\ 67}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| 30,000 | .00105 | .00035 | ..... | ..... | |
| 33,000 | .00110 | .00005 | ..... | ..... | Elastic limit. |
| 34,000 | .00130 | .00020 | ..... | ..... | |
| 35,000 | .01125 | .00995 | ..... | ..... | |
| 36,000 | .01275 | .00150 | ..... | ..... | |
| 37,000 | .01395 | .00120 | ..... | ..... | |
| 38,000 | .01465 | .00070 | ..... | ..... | |
| 69,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,900 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 28.9 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | gray amorphous 70 per cent, granular 30 per cent |
| Elongation of inch sections | | ″.20*, ″.20* |

## No. 6769.

Marks, $\begin{matrix} A\ 68 \\ P\ S\ 15 \end{matrix}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00030 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 22,000 | .00075 | .00015 | ..... | ..... | Elastic limit. |
| 23,000 | .00125 | .00050 | ..... | ..... | |
| 24,000 | .00205 | .00080 | ..... | ..... | |
| 25,000 | .00340 | .00135 | ..... | ..... | |
| 26,000 | .00395 | .00055 | ..... | ..... | |
| 27,000 | .00480 | .00085 | ..... | ..... | |
| 64,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 64,900 |
| Elastic limit per square inch of original section | do... | 22,000 |
| Elongation per inch after rupture | inch.. | .2400 |
| Elongation per inch under strain at elastic limit | do... | .00075 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky, oblique |
| Elongation of inch sections | | ″.22*, ″.26* |

## No. 6646.

Marks, $\overset{A\ 69}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00040 | .00030 | ..... | ..... | |
| 20,000 | .00075 | .00035 | ..... | ..... | |
| 25,000 | .00095 | .00020 | ..... | ..... | |
| 26,000 | .00105 | .00010 | ..... | ..... | |
| 27,000 | .00110 | .00005 | ..... | ..... | Elastic limit. |
| 28,000 | .01625 | .01515 | ..... | ..... | |
| 29,000 | .01900 | .00275 | ..... | ..... | |
| 30,000 | .02050 | .00150 | ..... | ..... | |
| 31,000 | .02250 | .00200 | ..... | ..... | |
| 32,000 | .02525 | .00275 | ..... | ..... | |
| 54,350 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 54,350 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .3450 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | 1″.20 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.40*, ″.19 |

## No. 6900.

Marks, $\frac{A\ 69}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 25,000 | .00080 | .00020 | ..... | ..... | |
| 26,000 | .00085 | .00005 | ..... | ..... | |
| 27,000 | .00090 | .00005 | ..... | ..... | Elastic limit. |
| | .01600 | .01510 | ..... | ..... | |
| 28,000 | .01750 | .00150 | ..... | ..... | |
| 29,000 | .02000 | .00250 | ..... | ..... | |
| 30,000 | .02075 | .00075 | ..... | ..... | |
| 31,000 | .02250 | .00175 | ..... | ..... | |
| 32,000 | .02560 | .00310 | ..... | ..... | |
| 54,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 54,050 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .3200 |
| Elongation per inch under strain at elastic limit | do... | .00090 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.30, ″.34* |

## No. 6647.

Marks, $\overset{A\ 70}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00020 | .00010 | ..... | ..... | |
| 20,000 | .00055 | .00035 | ..... | ..... | |
| 30,000 | .00090 | .00035 | ..... | ..... | |
| 32,000 | .00095 | .00005 | ..... | ..... | |
| 33,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 34,000 | .01350 | .01250 | ..... | ..... | |
| 35,000 | .01425 | .00075 | ..... | ..... | |
| 36,000 | .01525 | .00100 | ..... | ..... | |
| 37,000 | .01650 | .00125 | ..... | ..... | |
| 38,000 | .01800 | .00150 | ..... | ..... | |
| 65,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 65,600 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .1750 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | dull amorphous, with trace of granulation |
| Elongation of inch sections | | ″.16*, ″.19* |

## No. 6648.

Marks, $\frac{A\ 71}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00055 | .00030 | ..... | ..... | |
| 27,000 | .00080 | .00025 | ..... | ..... | |
| 28,000 | .00090 | .00010 | ..... | ..... | Elastic limit |
| 29,000 | .00800 | .00710 | ..... | ..... | |
| 30,000 | .00900 | .00100 | ..... | ..... | |
| 31,000 | .00975 | .00075 | ..... | ..... | |
| 32,000 | .01100 | .00125 | ..... | ..... | |
| 33,000 | .01265 | .00165 | ..... | ..... | |
| 66,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,600 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .2450 |
| Elongation per inch under strain at elastic limit | do... | .00090 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 34.0 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular, 50 per cent; dull silky, 50 per cent |
| Elongation of inch sections | | ″.30*, ″.19 |

## No. 6649.

Marks, $\overset{A\ 72}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 31,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 32,000 | .01400 | .01295 | ..... | ..... | |
| 33,000 | .01500 | .00100 | ..... | ..... | |
| 34,000 | .01640 | .00140 | ..... | ..... | |
| 35,000 | .01725 | .00085 | ..... | ..... | |
| 36,000 | .01850 | .00125 | ..... | ..... | |
| 63,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 63,500 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .1950 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.55 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.20*, ″.19 |

## No. 6650.

Marks, $\frac{A\ 73}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00040 | .00030 | ..... | ..... | |
| 20,000 | .00080 | .00040 | ..... | ..... | |
| 21,000 | .00085 | .00005 | ..... | ..... | Elastic limit. |
| 22,000 | .00125 | .00040 | ..... | ..... | |
| 23,000 | .00150 | .00025 | ..... | ..... | |
| 24,000 | .00170 | .00020 | ..... | ..... | |
| 25,000 | .00200 | .00030 | ..... | ..... | |
| 26,000 | .00230 | .00030 | ..... | ..... | |
| 27,000 | .00260 | .00030 | ..... | ..... | |
| 28,000 | .00295 | .00035 | ..... | ..... | |
| 29,000 | .00350 | .00055 | ..... | ..... | |
| 30,000 | .00425 | .00075 | ..... | ..... | |
| 70,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,100 |
| Elastic limit per square inch of original section | do... | 21,000 |
| Elongation per inch after rupture | inch.. | .1850 |
| Elongation per inch under strain at elastic limit | do... | .00085 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | silky, trace of granulation |
| Elongation of inch sections | | ″.17, ″.20* |

## No. 6770.

Marks, $\frac{A\ 74}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00035 | .00030 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 25,000 | .00100 | .00040 | ..... | ..... | Elastic limit. |
| 26,000 | .00145 | .00045 | ..... | ..... | |
| 27,000 | .00185 | .00040 | ..... | ..... | |
| 28,000 | .00260 | .00075 | ..... | ..... | |
| 29,000 | .00315 | .00055 | ..... | ..... | |
| 30,000 | .00400 | .00085 | ..... | ..... | |
| 73,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 73,600 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.8 from neck |
| Character of broken surface | | granular 70 per cent, dull silky 30 per cent |
| Elongation of inch sections | | ″.20*, ″.16 |

## No. 6771.

Marks, $\overset{A\ 75}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00025 | .00020 | ..... | ..... | |
| 20,000 | .00055 | .00030 | ..... | ..... | |
| 21,000 | .00065 | .00010 | ..... | ..... | Elastic limit. |
| 22,000 | .00210 | .00145 | ..... | ..... | |
| 23,000 | .00550 | .00340 | ..... | ..... | |
| 24,000 | .00750 | .00200 | ..... | ..... | |
| 25,000 | .00850 | .00100 | ..... | ..... | |
| 26,000 | .01000 | .00150 | ..... | ..... | |
| 55,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch at original section | pounds.. | 55,600 |
| Elastic limit per square inch of original section | do... | 21,000 |
| Elongation per inch after rupture | inch.. | .1250 |
| Elongation per inch under strain at elastic limit | do... | .00065 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | coarse granular, silvery luster |
| Elongation of inch sections | | ″.11, ″.14* |

## No. 6797.

Marks, $\frac{A\ 75}{2\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00085 | .00030 | ..... | ..... | |
| 18,000 | .00050 | .00015 | ..... | ..... | |
| 19,000 | .00060 | .00010 | ..... | ..... | Elastic limit. |
| 20,000 | .00295 | .00235 | ..... | ..... | |
| 21,000 | .00400 | .00105 | ..... | ..... | |
| 22,000 | .00550 | .00150 | ..... | ..... | |
| 23,000 | .00655 | .00105 | ..... | ..... | |
| 24,000 | .00800 | .00145 | ..... | ..... | |
| 55,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 55,600 |
| Elastic limit per square inch of original section | do... | 19,000 |
| Elongation per inch after rupture | inch.. | .1500 |
| Elongation per inch under strain at elastic limit | do... | .00060 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction of area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | 1″.06 from neck |
| Character of broken surface | | coarse granular |
| Elongation of inch sections | | ″.16*, ″.14 |

## No. 6772.

Marks, $\overset{A\ 76}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00035 | .00030 | ..... | ..... | |
| 20,000 | .00080 | .00045 | ..... | ..... | |
| 22,000 | .00095 | .00015 | ..... | ..... | Elastic limit. |
| 23,000 | .00190 | .00095 | ..... | ..... | |
| 24,000 | .00260 | .00070 | ..... | ..... | |
| 25,000 | .00350 | .00090 | ..... | ..... | |
| 26,000 | .00400 | .00050 | ..... | ..... | |
| 27,000 | .00475 | .00075 | ..... | ..... | |
| 73,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 73,400 |
| Elastic limit per square inch of original section | do... | 22,000 |
| Elongation per inch after rupture | inch.. | .2050 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ″.19, ″.22* |

## No. 6773.

Marks, $\begin{matrix} A\ 77 \\ P\ S\ 15 \end{matrix}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00085 | .00030 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 22,000 | .00085 | .00025 | ..... | ..... | |
| 23,000 | .00095 | .00010 | ..... | ..... | Elastic limit. |
| 24,000 | .00250 | .00155 | ..... | ..... | |
| 25,000 | .00450 | .00200 | ..... | ..... | |
| 26,000 | .00560 | .00110 | ..... | ..... | |
| 27,000 | .00650 | .00090 | ..... | ..... | |
| 28,000 | .00775 | .00125 | ..... | ..... | |
| 64,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 64,100 |
| Elastic limit per square inch of original section | do... | 23,000 |
| Elongation per inch after rupture | inch.. | .2750 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 34.0 |
| Position of rupture | | 1". from neck |
| Character of broken surface | | silky 50 per cent, granular 50 per cent |
| Elongation of inch sections | | ".32*, ".28 |

## No. 6774.

Marks, $\frac{A\ 78}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00090 | ..... | ..... | Elastic limit. |
| 21,000 | .00105 | .00040 | ..... | ..... | |
| 22,000 | .00180 | .00075 | ..... | ..... | |
| 23,000 | .00450 | .00270 | ..... | ..... | |
| 24,000 | .00900 | .00450 | ..... | ..... | |
| 25,000 | .01000 | .00100 | ..... | ..... | |
| 55,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 55,100 |
| Elastic limit per square inch of original section | do... | 20,000 |
| Elongation per inch after rupture | inch.. | .3250 |
| Elongation per inch under strain at elastic limit | do... | .00065 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.28, ″.42* |

## No. 6997.

Marks, $\overset{A\ 78}{2\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 25,000 | .00090 | .00025 | ..... | ..... | |
| 26,000 | .00095 | .00005 | ..... | ..... | Elastic limit. |
| 27,000 | .00165 | .00070 | ..... | ..... | |
| 28,000 | .00400 | .00235 | ..... | ..... | |
| 29,000 | .00550 | .00150 | ..... | ..... | |
| 30,000 | .00640 | .00090 | ..... | ..... | |
| 31,000 | .00700 | .00060 | ..... | ..... | |
| 72,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,100 |
| Elastic limit per square inch of original section | do... | 26,000 |
| Elongation per inch after rupture | inch... | .2500 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 34.0 |
| Position of rupture | | 1″.05 from neck |
| Character of broken surface | | granular 60 per cent, dull silky 40 per cent |
| Elongation of inch sections | | ″.21, ″.29* |

## No. 6775.

Marks, $\frac{A\ 79}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remark. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00040 | .00030 | ..... | ..... | |
| 17,000 | .00060 | .00020 | ..... | ..... | Elastic limit. |
| 18,000 | .00475 | .00415 | ..... | ..... | |
| 19,000 | .00600 | .00125 | ..... | ..... | |
| 20,000 | .00745 | .00145 | ..... | ..... | |
| 21,000 | .00995 | .00250 | ..... | ..... | |
| 22,000 | .01125 | .00130 | ..... | ..... | |
| 49,850 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 49,850 |
| Elastic limit per square inch of original section | do... | 17,000 |
| Elongation per inch after rupture | inch.. | .3550 |
| Elongation per inch under strain at elastic limit | do... | .00060 |
| Reduction in diameter at point of rupture | do... | .175 |
| Reduction in area after rupture, per cent of original section | | 57.2 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.23, ″.48* |

## No. 6776.

Marks, $\overset{A\ 80}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00040 | .00030 | ..... | ..... | |
| 19,000 | .00095 | .00055 | ..... | ..... | Elastic limit. |
| 20,000 | .00155 | .00060 | ..... | ..... | |
| 21,000 | .00240 | .00085 | ..... | ..... | |
| 22,000 | .00365 | .00125 | ..... | ..... | |
| 23,000 | .00450 | .00085 | ..... | ..... | |
| 24,000 | .00600 | .00150 | ..... | ..... | |
| 59,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 59,050 |
| Elastic limit per square inch of original section | do... | 19,000 |
| Elongation per inch after rupture | inch.. | .2700 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .105 |
| Reduction in area after rupture, per cent of original section | | 37.1 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | silky, trace of granulation |
| Elongation of inch sections | | ″.20, ″.34* |

## No. 6873.

Marks, $\frac{A\ 80}{2\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 37,000 | .00120 | .00020 | ..... | ..... | |
| 38,000 | .00130 | .00010 | ..... | ..... | Elastic limit. |
| | .00550 | .00420 | ..... | ..... | |
| 39,000 | .00800 | .00250 | ..... | ..... | |
| 40,000 | .00850 | .00050 | ..... | ..... | |
| 41,000 | .00925 | .00075 | ..... | ..... | |
| 42,000 | .01050 | .00125 | ..... | ..... | |
| 43,000 | .01150 | .00100 | ..... | ..... | |
| 74,150 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 74,150 |
| Elastic limit per square inch of original section | do... | 38,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .00130 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ″.50 from neck |
| Character of broken surface | | dull gray, amorphous |
| Elongation of inch sections | | ″.13, ″.25* |

## No. 6874.

Marks, $\frac{A\ 81}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 26,000 | .00080 | .00020 | ..... | ..... | |
| 27,000 | .00090 | .00010 | ..... | ..... | Elastic limit. |
| 28,000 | .00130 | .00040 | ..... | ..... | |
| 29,000 | .00250 | .00120 | ..... | ..... | |
| 30,000 | .00335 | .00085 | ..... | ..... | |
| 31,000 | .00430 | .00095 | ..... | ..... | |
| 32,000 | .00500 | .00070 | ..... | ..... | |
| 74,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 74,550 |
| Elastic limit, per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch... | .2050 |
| Elongation per inch under strain at elastic limit | do... | .00090 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ″.65 from neck |
| Character of broken surface | | granular 60 per cent, dull silky 40 per cent |
| Elongation of inch sections | | ″.18, ″.23* |

## No. 6855.

Marks, $\frac{A\ 82}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00080 | .00020 | ..... | ..... | |
| 20,000 | .00055 | .00025 | ..... | ..... | |
| 30,000 | .00110 | .00055 | ..... | ..... | Elastic limit. |
| | .00200 | .00090 | ..... | ..... | |
| 31,000 | .00300 | .00100 | ..... | ..... | |
| 32,000 | .00355 | .00055 | ..... | ..... | |
| 33,000 | .00450 | .00095 | ..... | ..... | |
| 34,000 | .00550 | .00100 | ..... | ..... | |
| 35,000 | .00600 | .00050 | ..... | ..... | |
| 75,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 75,950 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .1950 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.19 from neck |
| Character of broken surface | | granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.21*, ″.18 |

## No. 6875.

Marks, $\frac{A\ 83}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 24,000 | .00090 | .00030 | ..... | ..... | Elastic limit. |
| 25,000 | .00115 | .00025 | ..... | ..... | |
| 26,000 | .00175 | .00060 | ..... | ..... | |
| 27,000 | .00250 | .00075 | ..... | ..... | |
| 28,000 | .00315 | .00065 | ..... | ..... | |
| 29,000 | .00400 | .00085 | ..... | ..... | |
| 71,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,950 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .1750 |
| Elongation per inch under strain at elastic limit | do... | .00090 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.50 from neck |
| Character of broken surface | | dull amorphous, oblique |
| Elongation of inch sections | | ″.20, ″.15 |

## No. 6876.

Marks, $\frac{A\ 84}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 26,000 | .00100 | .00035 | ..... | ..... | Elastic limit. |
| 27,000 | .00130 | .00030 | ..... | ..... | |
| 28,000 | .00175 | .00045 | ..... | ..... | |
| 29,000 | .00230 | .00055 | ..... | ..... | |
| 30,000 | .00300 | .00070 | ..... | ..... | |
| 31,000 | .00360 | .00060 | ..... | ..... | |
| 74,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 74,450 |
| Elastic limit per square inch of original section | do... | 26,000 |
| Elongation per inch after rupture | inch.. | .1750 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.7 from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.16, ″.19* |

## No. 6856.

Marks, $\frac{A\ 85}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 28,000 | .00085 | .00025 | ..... | ..... | |
| 29,000 | .00095 | .00010 | ..... | ..... | Elastic limit. |
| 30,000 | .00150 | .00055 | ..... | ..... | |
| 31,000 | .00290 | .00140 | ..... | ..... | |
| 32,000 | .00365 | .00075 | ..... | ..... | |
| 33,000 | .00430 | .00065 | ..... | ..... | |
| 34,000 | .00500 | .00070 | ..... | ..... | |
| 77,450 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 77,450 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1350 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.15*, ″.12 |

## No. 6857.

Marks, $\frac{A\ 86}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00040 | .00030 | ..... | ..... | |
| 20,000 | .00060 | .00020 | ..... | ..... | |
| 25,000 | .00100 | .00040 | ..... | ..... | |
| 26,000 | .00110 | .00010 | ..... | ..... | |
| 27,000 | .00115 | .00005 | ..... | ..... | Elastic limit. |
| 28,000 | .00150 | .00035 | ..... | ..... | |
| 29,000 | .00195 | .00045 | ..... | ..... | |
| 30,000 | .00250 | .00055 | ..... | ..... | |
| 31,000 | .00300 | .00050 | ..... | ..... | |
| 32,000 | .00390 | .00090 | ..... | ..... | |
| 78,600 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 78,600 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .1750 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.16, ″.19* |

## No. 6858.

Marks, $\frac{A\ 87}{P\ S\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 24,000 | .00085 | .00025 | ..... | ..... | Elastic limit. |
| 25,000 | .00150 | .00065 | ..... | ..... | |
| 26,000 | .00450 | .00300 | ..... | ..... | |
| 27,000 | .00575 | .00125 | ..... | ..... | |
| 28,000 | .00640 | .00065 | ..... | ..... | |
| 29,000 | .00750 | .00110 | ..... | ..... | |
| 65,500 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 65,500 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .2700 |
| Elongation per inch under strain at elastic limit | do... | .00085 |
| Reduction in diameter at point of rupture | do... | .105 |
| Reduction in area after rupture, per cent of original section | | 37.1 |
| Position of rupture | | ".85 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ".21, ".33* |

## No. 6877.

Marks, $\frac{A\ 88}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | Elastic limit. |
| 31,000 | .00200 | .00100 | ..... | ..... | |
| 32,000 | .00400 | .00200 | ..... | ..... | |
| 33,000 | .00475 | .00075 | ..... | ..... | |
| 34,000 | .00525 | .00050 | ..... | ..... | |
| 35,000 | .00650 | .00125 | ..... | ..... | |
| 76,200 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 76,200 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.70 from neck |
| Character of broken surface | | granular, dull silky spot at the circumference |
| Elongation of inch sections | | ″.19, ″.19* |

## No. 6878.

Marks, $\frac{A\ 89}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00080 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 25,000 | .00080 | .00020 | ..... | ..... | Elastic limit. |
| 26,000 | .00100 | .00020 | ..... | ..... | |
| 27,000 | .00800 | .00200 | ..... | ..... | |
| 28,000 | .00860* | .00060 | ..... | ..... | |
| 29,000 | .00460 | .00100 | ..... | ..... | |
| 30,000 | .00520 | .00060 | ..... | ..... | |
| 76,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 76,000 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00080 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | ″.55 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ″.20*, ″.16 |

## No. 6859.

Marks, $\begin{matrix} A\ 90 \\ P\ S\ 15 \end{matrix}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 28,000 | .00100 | .00035 | ..... | ..... | Elastic limit. |
| 29,000 | .00150 | .00050 | ..... | ..... | |
| 30,000 | .00195 | .00045 | ..... | ..... | |
| 31,000 | .00260 | .00065 | ..... | ..... | |
| 32,000 | .00360 | .00100 | ..... | ..... | |
| 33,000 | .00460 | .00100 | ..... | ..... | |
| 75,700 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 75,700 |
| Elastic limit per square inch of original section | do.... | 28,000 |
| Elongation per inch after rupture | inch.. | .2050 |
| Elongation per inch under strain at elastic limit | do.... | .00100 |
| Reduction in diameter at point of rupture | do.... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | 1″.17 from neck |
| Character of broken surface | | granular, dull flaky spot at the circumference |
| Elongation of inch sections | | ″.18, ″.23* |

## No. 6860.

Marks, $\frac{A\ 91}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 25,000 | .00095 | .00035 | ..... | ..... | Elastic limit. |
| 26,000 | .00120 | .00025 | ..... | ..... | |
| 27,000 | .00215 | .00095 | ..... | ..... | |
| 28,000 | .00290 | .00075 | ..... | ..... | |
| 29,000 | .00385 | .00095 | ..... | ..... | |
| 30,000 | .00460 | .00075 | ..... | ..... | |
| 70,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,500 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .2100 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 28.9 |
| Position of rupture | | 1″.14 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.22*, ″.20 |

## No. 6861.

Marks, $\frac{A\ 92}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 19,000 | .00065 | .00035 | ..... | ..... | Elastic limit. |
| 20,000 | .00145 | .00080 | ..... | ..... | |
| 21,000 | .00200 | .00055 | ..... | ..... | |
| 22,000 | .00255 | .00055 | ..... | ..... | |
| 23,000 | .00365 | .00110 | ..... | ..... | |
| 24,000 | .00510 | .00145 | ..... | ..... | |
| 55,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 55,400 |
| Elastic limit per square inch of original section | do... | 19,000 |
| Elongation per inch after rupture | inch.. | .2650 |
| Elongation per inch under strain at elastic limit | do... | .00065 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.20, ″.33* |

## No. 6862.

Marks, $\frac{A\ 93}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 17,000 | .00060 | .00025 | ..... | ..... | Elastic limit. |
| 18,000 | .00250 | .00190 | ..... | ..... | |
| 19,000 | .00450 | .00200 | ..... | ..... | |
| 20,000 | .00610 | .00160 | ..... | ..... | |
| 21,000 | .00790 | .00180 | ..... | ..... | |
| 22,000 | .00915 | .00125 | ..... | ..... | |
| 51,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 51,600 |
| Elastic limit per square inch of original section | do... | 17,000 |
| Elongation per inch after rupture | inch.. | .3650 |
| Elongation per inch under strain at elastic limit | do... | .00060 |
| Reduction in diameter at point of rupture | do... | .155 |
| Reduction in area after rupture, per cent of original section | | 51.9 |
| Position of rupture | | 1″.15 from neck |
| Character of broken surface | | dull silky |
| Elongation of inch sections | | ″.30, ″.43* |

## No. 6998.

Marks, $\frac{A\ 93}{2\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 29,000 | .00095 | .00030 | ..... | ..... | Elastic limit. |
| 30,000 | .00725 | .00630 | ..... | ..... | |
| 31,000 | .00800 | .00075 | ..... | ..... | |
| 32,000 | .00925 | .00125 | ..... | ..... | |
| 33,000 | .01000 | .00075 | ..... | ..... | |
| 34,000 | .01090 | .00090 | ..... | ..... | |
| 71,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,100 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .2100 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.20, ″.22* |

## No. 6819.

Marks, $\frac{A\ 95}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00075 | .00040 | ..... | ..... | |
| 22,000 | .00090 | .00015 | ..... | ..... | |
| 23,000 | .00100 | .00010 | ..... | ..... | |
| 24,000 | .00110 | .00010 | ..... | ..... | Elastic limit. |
| 25,000 | .00140 | .00030 | ..... | ..... | |
| 26,000 | .00165 | .00025 | ..... | ..... | |
| 27,000 | .00195 | .00030 | ..... | ..... | |
| 28,000 | .00260 | .00065 | ..... | ..... | |
| 29,000 | .00340 | .00080 | ..... | ..... | |
| 30,000 | .00400 | .00060 | ..... | ..... | |
| 31,000 | .00550 | .00150 | ..... | ..... | |
| 32,000 | .00610 | .00060 | ..... | ..... | |
| 33,000 | .00750 | .00140 | ..... | ..... | |
| 64,050 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 64,050 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .2750 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .105 |
| Reduction in area after rupture, per cent of original section | | 87.1 |
| Position of rupture | | ″.70 from neck |
| Character of broken surface | | silky 70 per cent, granular 30 per cent |
| Elongation of inch sections | | ″.33*, ″.22 |

## No. 6863.

Marks, $\frac{A\ 96}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | Elastic limit. |
| 21,000 | .00115 | .00045 | ..... | ..... | |
| 22,000 | .00250 | .00135 | ..... | ..... | |
| 23,000 | .00400 | .00150 | ..... | ..... | |
| 24,000 | .00500 | .00100 | ..... | ..... | |
| 25,000 | .00625 | .00125 | ..... | ..... | |
| 60,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 60,900 |
| Elastic limit per square inch of original section | do... | 20,000 |
| Elongation per inch after rupture | inch.. | .3000 |
| Elongation per inch under strain at elastic limit | do... | .00070 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.21, ″.39* |

## No. 6999.

Marks, $\frac{A\ 96}{2\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 28,000 | .00100 | .00035 | ..... | ..... | |
| 29,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 30,000 | .00145 | .00040 | ..... | ..... | |
| 31,000 | .00165 | .00020 | ..... | ..... | |
| 32,000 | .00185 | .00020 | ..... | ..... | |
| 33,000 | .00290 | .00105 | ..... | ..... | |
| 34,000 | .00365 | .00075 | ..... | ..... | |
| 35,000 | .00490 | .00125 | ..... | ..... | |
| 80,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 80,500 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1850 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.06 from neck |
| Character of broken surface | | granular 70 per cent, silky 30 per cent |
| Elongation of inch sections | | ″.18, ″.19* |

## No. 6820.

Marks, $\frac{A\ 97}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00085 | .00050 | ..... | ..... | |
| 21,000 | .00095 | .00010 | ..... | ..... | |
| 22,000 | .00100 | .00005 | ..... | ..... | |
| 23,000 | .00110 | .00010 | ..... | ..... | Elastic limit. |
| 24,000 | .00135 | .00025 | ..... | ..... | |
| 25,000 | .00150 | .00015 | ..... | ..... | |
| 26,000 | .00175 | .00025 | ..... | ..... | |
| 27,000 | .00205 | .00030 | ..... | ..... | |
| 28,000 | .00300 | .00095 | ..... | ..... | |
| 29,000 | .00425 | .00125 | ..... | ..... | |
| 30,000 | .00500 | .00075 | ..... | ..... | |
| 70,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,100 |
| Elastic limit per square inch of original section | do... | 23,000 |
| Elongation per inch after rupture | inch.. | .2300 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | 1″.10 from neck |
| Character of broken surface | | fine granular, silky spot at the circumference |
| Elongation of inch sections | | ″.20, ″.26* |

## No. 6821.

Marks, $\frac{A\ 98}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00020 | .00010 | ..... | ..... | |
| 20,000 | .00060 | .00040 | ..... | ..... | |
| 22,000 | .00065 | .00005 | ..... | ..... | |
| 23,000 | .00070 | .00005 | ..... | ..... | |
| 24,000 | .00080 | .00010 | ..... | ..... | |
| 25,000 | .00090 | .00010 | ..... | ..... | |
| 26,000 | .00100 | .00010 | ..... | ..... | |
| 27,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 28,000 | .00120 | .00015 | ..... | ..... | |
| 29,000 | .00150 | .00030 | ..... | ..... | |
| 30,000 | .00165 | .00015 | ..... | ..... | |
| 31,000 | .00200 | .00035 | ..... | ..... | |
| 32,000 | .00240 | .00040 | ..... | ..... | |
| 33,000 | .00305 | .00065 | ..... | ..... | |
| 34,000 | .00350 | .00045 | ..... | ..... | |
| 35,000 | .00425 | .00075 | ..... | ..... | |
| 36,000 | .00500 | .00075 | ..... | ..... | |
| 58,100 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 58,100 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .0500 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .015 |
| Reduction in area after rupture, per cent of original section | | 5.7 |
| Position of rupture | | ″.30 from neck |
| Character of broken surface | | granular, seam near the circumference |
| Elongation of inch sections | | ″.04, ″.06* |

## No. 7186.

Marks, $\frac{A\ 98}{2\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| 30,000 | .00110 | .00040 | ..... | ..... | |
| 31,000 | .00115 | .00005 | ..... | ..... | |
| 32,000 | .00120 | .00005 | ..... | ..... | Elastic limit. |
| 33,000 | 00140 | .00020 | ..... | ..... | |
| 34,000 | .00950 | .00810 | ..... | ..... | |
| 35,000 | .01000 | .00050 | ..... | ..... | |
| 36,000 | .01050 | .00050 | ..... | ..... | |
| 37,000 | .01150 | .00100 | ..... | ..... | |
| 71,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,500 |
| Elastic limit per square inch of original section | do... | 32,000 |
| Elongation per inch after rupture | inch.. | .2050 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.98 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.20*, ″.21 |

## No. 6822.

Marks, $\frac{A\ 99}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00085 | .00060 | ..... | ..... | |
| 21,000 | .00095 | .00010 | ..... | ..... | Elastic limit, not well defined. |
| 22,000 | .00115 | .00020 | ..... | ..... | |
| 23,000 | .00130 | .00015 | ..... | ..... | |
| 24,000 | .00165 | .00035 | ..... | ..... | |
| 25,000 | .00200 | .00035 | ..... | ..... | |
| 26,000 | .00305 | .00105 | ..... | ..... | |
| 27,000 | .00345 | .00040 | ..... | ..... | |
| 28,000 | .00415 | .00070 | ..... | ..... | |
| 29,000 | .00495 | .00080 | ..... | ..... | |
| 30,000 | .00565 | .00070 | ..... | ..... | |
| 31,000 | .00660 | .00095 | ..... | ..... | |
| 32,000 | .00755 | .00095 | ..... | ..... | |
| 33,000 | .00815 | .00060 | ..... | ..... | |
| 69,500 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,500 |
| Elastic limit per square inch of original section, not well defined | do... | 21,000 |
| Elongation per inch after rupture | inch.. | .2250 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ″.90 from neck |
| Character of broken surface | | granular 60 per cent, dull silky 40 per cent |
| Elongation of inch sections | | ″.26*, ″.19 |

## No. 7166.

Marks, $\overset{A\ 99}{2\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| 30,000 | .00115 | .00045 | ..... | ..... | |
| 31,000 | .00115 | 0. | ..... | ..... | Elastic limit. |
| 32,000 | .01310 | .01195 | ..... | ..... | |
| 33,000 | .01325 | .00015 | ..... | ..... | |
| 34,000 | .01360 | .00035 | ..... | ..... | |
| 35,000 | .01450 | .00090 | ..... | ..... | |
| 36,000 | .01625 | .00175 | ..... | ..... | |
| 37,000 | .01760 | .00135 | ..... | ..... | |
| 63,400 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 63,400 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .2250 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | 1″.18 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.27*, ″.18 |

## No. 6850.

Marks, $\frac{A\ 100}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 21,000 | .00070 | .00010 | ..... | ..... | Elastic limit. |
| 22,000 | .00095 | .00025 | ..... | ..... | |
| 23,000 | .00450 | .00355 | ..... | ..... | |
| 24,000 | .00600 | .00150 | ..... | ..... | |
| 25,000 | .00650 | .00050 | ..... | ..... | |
| 26,000 | .00800 | .00150 | ..... | ..... | |
| 62,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 62,550 |
| Elastic limit per square inch of original section | do... | 21,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .00070 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.6 from neck |
| Character of broken surface | | granular, flaky spot at the circumference |
| Elongation of inch sections | | ″.20*, ″.18 |

## No. 7000.

Marks, $\frac{A\ 100}{2\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| 23,000 | .00085 | .00015 | ..... | ..... | Elastic limit. |
| 24,000 | .00140 | .00055 | ..... | ..... | |
| 25,000 | .00170 | .00030 | ..... | ..... | |
| 26,000 | .00350 | .00180 | ..... | ..... | |
| 27,000 | .00750 | .00400 | ..... | ..... | |
| 28,000 | .00825 | .00075 | ..... | ..... | |
| 66,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,450 |
| Elastic limit per square inch of original section | do... | 23,000 |
| Elongation per inch after rupture | inch.. | .2700 |
| Elongation per inch under strain at elastic limit | do... | .00085 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 34.0 |
| Position of rupture | | 1″.08 from neck |
| Character of broken surface | | dull silky, oblique |
| Elongation of inch sections | | ″.24, ″.30* |

## No. 6832.

Marks, $\frac{A\ 101}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00040 | .00025 | ..... | ..... | |
| 20,000 | .00075 | .00035 | ..... | ..... | |
| 22,000 | .00090 | .00015 | ..... | ..... | |
| 23,000 | .00095 | .00005 | ..... | ..... | Elastic limit. |
| 24,000 | .00115 | .00020 | ..... | ..... | |
| 25,000 | .00145 | .00030 | ..... | ..... | |
| 26,000 | .00200 | .00055 | ..... | ..... | |
| 27,000 | .00300 | .00100 | ..... | ..... | |
| 28,000 | .00390 | .00090 | ..... | ..... | |
| 29,000 | .00450 | .00060 | ..... | ..... | |
| 30,000 | .00535 | .00085 | ..... | ..... | |
| 31,000 | .00640 | .00105 | ..... | ..... | |
| 32,000 | .00725 | .00085 | ..... | ..... | |
| 33,000 | .00805 | .00080 | ..... | ..... | |
| 34,000 | .00900 | .00095 | ..... | ..... | |
| 69,400 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,400 |
| Elastic limit per square inch of original section | do... | 23,000 |
| Elongation per inch after rupture | inch.. | .2300 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | 1″.10 from neck |
| Character of broken surface | | granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.20, ″.26* |

## No. 6864.

Marks, $\frac{A\ 102}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00040 | .00030 | ..... | ..... | |
| 20,000 | .00085 | .00045 | ..... | ..... | |
| 21,000 | .00095 | .00010 | ..... | ..... | Elastic limit. |
| 22,000 | .00150 | .00055 | ..... | ..... | |
| 23,000 | .00200 | .00050 | ..... | ..... | |
| 24,000 | .00260 | .00060 | ..... | ..... | |
| 25,000 | .00350 | .00090 | ..... | ..... | |
| 26,000 | .00450 | .00100 | ..... | ..... | |
| 65,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 65,550 |
| Elastic limit per square inch of original section | do... | 21,000 |
| Elongation per inch after rupture | inch.. | .2850 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .115 |
| Reduction in area after rupture, per cent of original section | | 40.3 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | dull silky, oblique |
| Elongation of inch sections | | ″.22, ″.35* |

## No. 7001.

Marks, $\frac{A\ 102}{2\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | Initial load. |
| 1,000 | 0. | 0. | 0. | 0. | |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00040 | .00030 | ..... | ..... | |
| 20,000 | .00070 | .00030 | ..... | ..... | |
| 28,000 | .00095 | .00025 | ..... | ..... | |
| 29,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 30,000 | .00140 | .00040 | ..... | ..... | |
| 31,000 | .00180 | .00040 | ..... | ..... | |
| 32,000 | .00550 | .00370 | ..... | ..... | |
| 33,000 | .00650 | .00100 | ..... | ..... | |
| 34,000 | .00725 | .00075 | ..... | ..... | |
| 75,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 75,500 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1400 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 18.2 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.15*, ″.18 |

## No. 6865.

Marks, $\overset{A\ 108}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00075 | .00040 | ..... | ..... | Elastic limit. |
| 21,000 | .00100 | .00025 | ..... | ..... | |
| 22,000 | .00130 | .00030 | ..... | ..... | |
| 23,000 | .00195 | .00065 | ..... | ..... | |
| 24,000 | .00265 | .00070 | ..... | ..... | |
| 25,000 | .00355 | .00090 | ..... | ..... | |
| 65,250 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 65,250 |
| Elastic limit per square inch of original section | do... | 20,000 |
| Elongation per inch after rupture | inch.. | .2800 |
| Elongation per inch under strain at elastic limit | do... | .00075 |
| Reduction in diameter at point of rupture | do... | .105 |
| Reduction in area after rupture, per cent of original section | | 37.1 |
| Position of rupture | | ″.8 from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.18, ″.34* |

## No. 7002.

Marks, $\frac{A\ 103}{2\ P\ S\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 24,000 | .00085 | .00025 | ..... | ..... | Elastic limit. |
| 25,000 | .00150 | .00065 | ..... | ..... | |
| 26,000 | .00400 | .00250 | ..... | ..... | |
| 27,000 | .00500 | .00100 | ..... | ..... | |
| 28,000 | .00575 | .00075 | ..... | ..... | |
| 29,000 | .00665 | .00090 | ..... | ..... | |
| 69,800 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,800 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .2700 |
| Elongation per inch under strain at elastic limit | do... | .00085 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 34.0 |
| Position of rupture | | ".85 from neck |
| Character of broken surface | | granular 60 per cent, silky flaky 40 per cent |
| Elongation of inch sections | | ".28, ".31* |

## No. 6866.

Marks, $\frac{A\ 104}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 24,000 | .00090 | .00030 | ..... | ..... | Elastic limit. |
| 25,000 | .00455 | .00365 | ..... | ..... | |
| 26,000 | .00550 | .00095 | ..... | ..... | |
| 27,000 | .00645 | .00095 | ..... | ..... | |
| 28,000 | .00710 | .00065 | ..... | ..... | |
| 29,000 | .00800 | .00090 | ..... | ..... | |
| 66,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,900 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .2300 |
| Elongation per inch under strain at elastic limit | do... | .0009 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | 1″.07 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ″.22, ″.24* |

## No. 6867.

Marks, $\frac{A\ 105}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00080 | .00045 | ..... | ..... | Elastic limit. |
| 21,000 | .00100 | .00020 | ..... | ..... | |
| 22,000 | .00145 | .00045 | ..... | ..... | |
| 23,000 | .00215 | .00070 | ..... | ..... | |
| 24,000 | .00310 | .00095 | ..... | ..... | |
| 25,000 | .00400 | .00090 | ..... | ..... | |
| 65,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 65,500 |
| Elastic limit per square inch of original section | do... | 20,000 |
| Elongation per inch after rupture | inch.. | .2500 |
| Elongation per inch under strain at elastic limit | do... | .00080 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 34.0 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | silky, granular center |
| Elongation of inch sections | | ″.22, ″.28* |

## No. 6879.

Marks, $\frac{A\ 106}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 28,000 | .00105 | .00045 | ..... | ..... | Elastic limit. |
| 29,000 | .00350 | .00245 | ..... | ..... | |
| 30,000 | .00450 | .00100 | ..... | ..... | |
| 31,000 | .00550 | .00100 | ..... | ..... | |
| 32,000 | .00595 | .00045 | ..... | ..... | |
| 33,000 | .00690 | .00095 | ..... | ..... | |
| 72,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,600 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .2850 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 84.0 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.26*, ″.21 |

## No. 6880.

Marks, $\frac{A\ 107}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 24,000 | .00095 | .00035 | ..... | ..... | |
| 25,000 | .00105 | .00010 | ..... | ..... | Elastic limit. |
| 26,000 | .00150 | .00045 | ..... | ..... | |
| 27,000 | .00450 | .00300 | ..... | ..... | |
| 28,000 | .00550 | .00100 | ..... | ..... | |
| 29,000 | .00650 | .00100 | ..... | ..... | |
| 30,000 | .00750 | .00100 | ..... | ..... | |
| 69,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,500 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .2250 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.25*, ″.20 |

## No. 6881.

Marks, $\frac{A\ 108}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 25,000 | .00100 | .00040 | ..... | ..... | Elastic limit. |
| 26,000 | .00125 | .00025 | ..... | ..... | |
| 27,000 | .00195 | .00070 | ..... | ..... | |
| 28,000 | .00285 | .00090 | ..... | ..... | |
| 29,000 | .00350 | .00065 | ..... | ..... | |
| 30,000 | .00450 | .00100 | ..... | ..... | |
| 72,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,950 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .2250 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular |
| Elongation of inch sections | | ″.19, ″.26* |

## No. 6882.

Marks, $\frac{A\ 109}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 28,000 | .00095 | .00085 | ..... | ..... | Elastic limit. |
| 29,000 | .00140 | .00045 | ..... | ..... | |
| 30,000 | .00750 | .00610 | ..... | ..... | |
| 31,000 | .00850 | .00100 | ..... | ..... | |
| 32,000 | .00900 | .00050 | ..... | ..... | |
| 33,000 | .01000 | .00100 | ..... | ..... | |
| 70,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds | 70,900 |
| Elastic limit per square inch of original section | do | 28,000 |
| Elongation per inch after rupture | inch | .2500 |
| Elongation per inch under strain at elastic limit | do | .00095 |
| Reduction in diameter at point of rupture | do | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.25*, ″.25* |

## No. 6883.

Marks, $\frac{A\ 110}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 25,000 | .00085 | .00025 | ..... | ..... | |
| 27,000 | .00100 | .00015 | ..... | ..... | Elastic limit. |
| 28,000 | .00825 | .00725 | ..... | ..... | |
| 29,000 | .00875 | .00050 | ..... | ..... | |
| 30,000 | .01015 | .00140 | ..... | ..... | |
| 31,000 | .01095 | .00080 | ..... | ..... | |
| 32,000 | .01160 | .00065 | ..... | ..... | |
| 66,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,500 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .2500 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 80.7 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | granular 70 per cent, silky 30 per cent |
| Elongations of inch sections | | ″.29*, ″.21 |

## No. 6884.

Marks, $\frac{A\ 111}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 35,000 | .00125 | .00025 | ..... | ..... | Elastic limit. |
| | .00700 | .00575 | ..... | ..... | |
| 36,000 | .00780 | .00080 | ..... | ..... | |
| 37,000 | .00815 | .00035 | ..... | ..... | |
| 38,000 | .00900 | .00085 | ..... | ..... | |
| 39,000 | .00950 | .00050 | ..... | ..... | |
| 40,000 | .01050 | .00100 | ..... | ..... | |
| 82,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 82,000 |
| Elastic limit per square inch of original section | do... | 85,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .00125 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.50 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ″.17, ″.21* |

## No. 6949.

Marks, $\frac{A\ 112}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 26,000 | .00090 | .00030 | ..... | ..... | Elastic limit. |
| 27,000 | .00135 | .00045 | ..... | ..... | |
| 28,000 | .00300 | .00165 | ..... | ..... | |
| 29,000 | .00390 | .00090 | ..... | ..... | |
| 30,000 | .00450 | .00060 | ..... | ..... | |
| 31,000 | .00535 | .00085 | ..... | ..... | |
| 72,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,900 |
| Elastic limit per square inch of original section | do... | 26,000 |
| Elongation per inch after rupture | inch.. | .2200 |
| Elongation per inch under strain at elastic limit | do... | .00090 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.28, ″.21 |

## No. 7003.

Marks, $\frac{A\ 112}{2\ P\ S\ 15}$
Diameter, ″.505.
Sectional area. .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| 24,000 | .00095 | .00025 | ..... | ..... | Elastic limit. |
| 25,000 | .00150 | .00055 | ..... | ..... | |
| 26,000 | .00185 | .00035 | ..... | ..... | |
| 27,000 | .00220 | .00035 | ..... | ..... | |
| 28,000 | .00300 | .00080 | ..... | ..... | |
| 29,000 | .00350 | .00050 | ..... | ..... | |
| 30,000 | .00425 | .00075 | ..... | ..... | |
| 78,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 78,450 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .1500 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.70 from neck |
| Character of broken surface | | granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.13, ″.17* |

## No. 6971.

Marks, $\frac{A\ 113}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 28,000 | .00100 | .00035 | ..... | ..... | Elastic limit. |
| 29,000 | .00950 | .00850 | ..... | ..... | |
| 30,000 | .01005 | .00055 | ..... | ..... | |
| 31,000 | .01100 | .00095 | ..... | ..... | |
| 32,000 | .01200 | .00100 | ..... | ..... | |
| 33,000 | .01310 | .00110 | ..... | ..... | |
| 65,350 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 65,350 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.8 from neck |
| Character of broken surface | | granular, dull silky spot at the circumference |
| Elongation of inch sections | | ″.18*, ″.18 |

## No. 6966.

Marks, $\frac{A\ 114}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 28,000 | .00095 | .00030 | ..... | ..... | Elastic limit. |
| 29,000 | .00780 | .00685 | ..... | ..... | |
| 30,000 | .00850 | .00070 | ..... | ..... | |
| 31,000 | .00925 | .00075 | ..... | ..... | |
| 32,000 | .01010 | .00085 | ..... | ..... | |
| 33,000 | .01150 | .00140 | ..... | ..... | |
| 68,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,450 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .1150 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.11, ″.12* |

## No. 6967.

Marks, $\frac{A\ 115}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 23,000 | .00085 | .00020 | ..... | ..... | |
| 24,000 | .00095 | .00010 | ..... | ..... | Elastic limit. |
| 25,000 | .00450 | .00355 | ..... | ..... | |
| 26,000 | .00535 | .00085 | ..... | ..... | |
| 27,000 | .00600 | .00065 | ..... | ..... | |
| 28,000 | .00675 | .00075 | ..... | ..... | |
| 29,000 | .00760 | .00085 | ..... | ..... | |
| 68,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,900 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .2500 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | 1″.2 from neck |
| Character of broken surface | | granular 70 per cent, dull silky 30 per cent |
| Elongation of inch sections | | ″.27*, ″.23 |

## No. 6968.

Marks, $\frac{A\ 116}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 28,000 | .00095 | .00030 | ..... | ..... | Elastic limit. |
| 29,000 | .00235 | .00140 | ..... | ..... | |
| 30,000 | .00550 | .00315 | ..... | ..... | |
| 31,000 | .00785 | .00235 | ..... | ..... | |
| 32,000 | .00825 | .00040 | ..... | ..... | |
| 33,000 | .00900 | .00075 | ..... | ..... | |
| 72,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,500 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .1950 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.20*, ″.19* |

## No. 6972.

Marks, $\frac{A\ 117}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00095 | .00085 | ..... | ..... | |
| 32,000 | .00105 | .00010 | ..... | ..... | Elastic limit. |
| 83,000 | .00765 | .00660 | ..... | ..... | |
| 84,000 | .00860 | .00095 | ..... | ..... | |
| 85,000 | .00905 | .00045 | ..... | ..... | |
| 86,000 | .00950 | .00045 | ..... | ..... | |
| 87,000 | .01060 | .00110 | ..... | ..... | |
| 77,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 77,600 |
| Elastic limit per square inch of original section | do... | 82,000 |
| Elongation per inch after rupture | inch.. | .2350 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.24, ″.23 |

## No. 6969.

Marks, $\frac{A\ 118}{P\ S\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| *29,000 | .00095 | .00025 | ..... | ..... | Elastic limit. |
| 30,000 | .00155 | .00060 | ..... | ..... | |
| 31,000 | .00470 | .00315 | ..... | ..... | |
| 32,000 | .00550 | .00080 | ..... | ..... | |
| 33,000 | .00600 | .00050 | ..... | ..... | |
| 34,000 | .00665 | .00065 | ..... | ..... | |
| 78,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 78,550 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .0950 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ".8 from neck |
| Character of broken surface | | granular, silky spot near the circumference |
| Elongation of inch sections | | ".10*, ".09 |

## No. 7187.

Marks, $\frac{A\ 118}{2\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 23,000 | .00090 | .00030 | ..... | ..... | |
| 24,000 | .00100 | .00010 | ..... | ..... | Elastic limit |
| 25,000 | .00175 | .00075 | ..... | ..... | |
| 26,000 | .00220 | .00045 | ..... | ..... | |
| 27,000 | .00350 | .00130 | ..... | ..... | |
| 28,000 | .00415 | .00065 | ..... | ..... | |
| 29,000 | .00500 | .00085 | ..... | ..... | |
| 30,000 | .00590 | .00090 | ..... | ..... | |
| 68,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,950 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .1350 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.70 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.15*, ″.12 |

## No. 7012.

Marks, $\frac{A\ 119}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2.″

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00040 | .00025 | ..... | ..... | |
| 20,000 | .00075 | .00035 | ..... | ..... | |
| 30,000 | .00125 | .00050 | ..... | ..... | Elastic limit. |
| 31,000 | .00560 | .00435 | ..... | ..... | |
| 32,000 | .00825 | .00265 | ..... | ..... | |
| 33,000 | .00900 | .00075 | ..... | ..... | |
| 34,000 | .00990 | .00090 | ..... | ..... | |
| 35,000 | .01095 | .00105 | ..... | ..... | |
| 36,000 | .01190 | .00095 | ..... | ..... | |
| 37,000 | .01300 | .00110 | ..... | ..... | |
| 71,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,450 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .1500 |
| Elongation per inch under strain at elastic limit | do... | .00125 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.80 from neck |
| Character of broken surface | | granular, dull spot at the circumference |
| Elongation of inch sections | | ″.15*, ″.15 |

## No. 7188.

Marks, $\frac{A\ 119}{2\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00030 | .00015 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 25,000 | .00090 | .00025 | ..... | ..... | |
| 29,000 | .00105 | .00015 | ..... | ..... | |
| 30,000 | .00110 | .00005 | ..... | ..... | Elastic limit. |
| 31,000 | .00810 | .00700 | ..... | ..... | |
| 32,000 | .00850 | .00040 | ..... | ..... | |
| 33,000 | .00915 | .00065 | ..... | ..... | |
| 34,000 | .01000 | .00085 | ..... | ..... | |
| 35,000 | .01125 | .00125 | ..... | ..... | |
| 71,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,450 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .2150 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | 1″.15 from neck |
| Character of broken surface | | granular 90 per cent, silky 10 per cent |
| Elongation of inch sections | | ″.21, ″.22* |

No. 7025.

Marks, $\frac{A\ 120}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00080 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00085 | ..... | ..... | |
| 30,000 | .00105 | .00040 | ..... | ..... | Elastic limit. |
| 31,000 | .00925 | .00820 | ..... | ..... | |
| 32,000 | .00990 | .00065 | ..... | ..... | |
| 33,000 | .01100 | .00110 | ..... | ..... | |
| 34,000 | .01175 | .00075 | ..... | ..... | |
| 35,000 | .01300 | .00125 | ..... | ..... | |
| 68,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,400 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do. . | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.22*, ″.18 |

## No. 7013.

Marks, $\frac{A\ 121}{P\ S\ 15.}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 25,000 | .00095 | .00035 | ..... | ..... | |
| 26,000 | .00105 | .00010 | ..... | ..... | Elastic limit. |
| 27,000 | .00165 | .00060 | ..... | ..... | |
| 28,000 | .00200 | .00035 | ..... | ..... | |
| 29,000 | .00260 | .00060 | ..... | ..... | |
| 30,000 | .00485 | .00175 | ..... | ..... | |
| 31,000 | .00540 | .00105 | ..... | ..... | |
| 32,000 | .00670 | .00180 | ..... | ..... | |
| 33,000 | .00810 | .00140 | ..... | ..... | |
| 72,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,900 |
| Elastic limit per square inch of original section | do... | 26,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | ″.60 from neck |
| Character of broken surface | | granular, dull spot at the circumference |
| Elongation of inch sections | | ″.26*, ″.14 |

## No. 7014.

Marks, $\frac{A\ 122}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00080 | .00015 | ..... | ..... | |
| 20,000 | .00070 | .00040 | ..... | ..... | |
| 25,000 | .00095 | .00025 | ..... | ..... | |
| 27,000 | .00105 | .00010 | ..... | ..... | |
| 29,000 | .00115 | .00010 | ..... | ..... | |
| 30,000 | .00125 | .00010 | ..... | ..... | Elastic limit. |
| 31,000 | .00650 | .00525 | ..... | ..... | |
| 32,000 | .00750 | .00100 | ..... | ..... | |
| 33,000 | .00800 | .00050 | ..... | ..... | |
| 34,000 | .00845 | .00045 | ..... | ..... | |
| 35,000 | .00925 | .00080 | ..... | ..... | |
| 36,000 | .01000 | .00075 | ..... | ..... | |
| 74,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 74,000 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do... | .00125 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | ″.60 from neck |
| Character of broken surface | | granular 80 per cent, dull silky 20 per cent |
| Elongation of inch section | | ″.22*, ″.18 |

## No. 7015.

Marks, $\frac{A\ 124}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 25,000 | .00080 | .00020 | ..... | ..... | |
| 27,000 | .00095 | .00015 | ..... | ..... | |
| 29,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 30,000 | .00800 | .00700 | ..... | ..... | |
| 31,000 | .00925 | .00125 | ..... | ..... | |
| 32,000 | .01030 | .00105 | ..... | ..... | |
| 33,000 | .01160 | .00130 | ..... | ..... | |
| 34,000 | .01250 | .00090 | ..... | ..... | |
| 35,000 | .01375 | .00125 | ..... | ..... | |
| 66,900 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,900 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1950 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | granular 75 per cent, dull silky 25 per cent |
| Elongation of inch sections | | ″.18, ″.21* |

## No. 7016.

Marks, $\frac{A\ 125}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00080 | .00015 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 25,000 | .00090 | .00025 | ..... | ..... | |
| 27,000 | .00105 | .00015 | ..... | ..... | |
| 28,000 | .00105 | 0. | ..... | ..... | |
| 29,000 | .00110 | .00005 | ..... | ..... | Elastic limit. |
| 30,000 | .01075 | .00965 | ..... | ..... | |
| 31,000 | .01080 | .00005 | ..... | ..... | |
| 32,000 | .01100 | .00020 | ..... | ..... | |
| 33,000 | .01200 | .00100 | ..... | ..... | |
| 34,000 | .01315 | .00115 | ..... | ..... | |
| 35,000 | .01475 | .00160 | ..... | ..... | |
| 36,000 | .01550 | .00075 | ..... | ..... | |
| 62,850 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of orignal section | pounds.. | 62,850 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1000 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 18.2 |
| Position of rupture | | ″.90 from neck |
| Character of broken surface | | granular 90 per cent, dull silky 10 per cent |
| Elongation of inch sections | | ″.10*, ″.10 |

## No. 7026.

Marks, $\frac{A\ 126}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00105 | .00040 | ..... | ..... | Elastic limit. |
| 31,000 | .01100 | .00995 | ..... | ..... | |
| 32,000 | .01200 | .00100 | ..... | ..... | |
| 33,000 | .01300 | .00100 | ..... | ..... | |
| 34,000 | .01465 | .00165 | ..... | ..... | |
| 35,000 | .01550 | .00085 | ..... | ..... | |
| 65,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 65,100 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .1500 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ″.25 from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.14, ″.16* |

## No. 7017.

Marks, $\frac{A\ 127}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00015 | .00010 | ..... | ..... | |
| 20,000 | .00050 | .00035 | ..... | ..... | |
| 30,000 | .00085 | .00035 | ..... | ..... | |
| 31,000 | .00095 | .00010 | ..... | ..... | |
| 32,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 33,000 | .00290 | .00190 | ..... | ..... | |
| 34,000 | .00630 | .00340 | ..... | ..... | |
| 35,000 | .00650 | .00020 | ..... | ..... | |
| 36,000 | .00705 | .00055 | ..... | ..... | |
| 37,000 | .00750 | .00045 | ..... | ..... | |
| 38,000 | .00855 | .00105 | ..... | ..... | |
| 81,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 81,500 |
| Elastic limit per square inch of original section | do... | 32,000 |
| Elongation per inch after rupture | inch.. | .1450 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular, dull spot at the circumference |
| Elongation of inch sections | | ″.14, ″.15* |

## No. 7136.

Marks, $\frac{A\ 128}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00020 | .00010 | ..... | ..... | |
| 20,000 | .00060 | .00040 | ..... | ..... | |
| 22,000 | .00085 | .00025 | ..... | ..... | Elastic limit. |
| 23,000 | .00105 | .00020 | ..... | ..... | |
| 24,000 | .00180 | .00075 | ..... | ..... | |
| 25,000 | .00350 | .00170 | ..... | ..... | |
| 26,000 | .00600 | .00250 | ..... | ..... | |
| 27,000 | .00675 | .00075 | ..... | ..... | |
| 28,000 | .00775 | .00100 | ..... | ..... | |
| 29,000 | .00900 | .00125 | ..... | ..... | |
| 30,000 | .01025 | .00125 | ..... | ..... | |
| 62,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 62,400 |
| Elastic limit per square inch of original section | do... | 22,000 |
| Elongation per inch after rupture | inch.. | .1650 |
| Elongation per inch under strain at elastic limit | do... | .00085 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.70 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.16, ″.17* |

## No. 7012.

Marks, $\frac{A\ 119}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2.″

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00040 | .00025 | ..... | ..... | |
| 20,000 | .00075 | .00035 | ..... | ..... | |
| 30,000 | .00125 | .00050 | ..... | ..... | Elastic limit. |
| 31,000 | .00560 | .00435 | ..... | ..... | |
| 32,000 | .00825 | .00265 | ..... | ..... | |
| 33,000 | .00900 | .00075 | ..... | ..... | |
| 34,000 | .00990 | .00090 | ..... | ..... | |
| 35,000 | .01095 | .00105 | ..... | ..... | |
| 36,000 | .01190 | .00095 | ..... | ..... | |
| 37,000 | .01300 | .00110 | ..... | ..... | |
| 71,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,450 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .1500 |
| Elongation per inch under strain at elastic limit | do... | .00125 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.80 from neck |
| Character of broken surface | | granular, dull spot at the circumference |
| Elongation of inch sections | | ″.15*, ″.15 |

## No. 7126.

Marks, $\frac{A\ 129}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00075 | .00040 | ..... | ..... | |
| 25,000 | .00100 | .00025 | ..... | ..... | |
| 26,000 | .00110 | .00010 | ..... | ..... | |
| 27,000 | .00120 | .00010 | ..... | ..... | Elastic limit. |
| 28,000 | .00145 | .00025 | ..... | ..... | |
| 29,000 | .00275 | .00130 | ..... | ..... | |
| 30,000 | .00400 | .00125 | ..... | ..... | |
| 31,000 | .00515 | .00115 | ..... | ..... | |
| 32,000 | .00625 | .00110 | ..... | ..... | |
| 33,000 | .00750 | .00125 | ..... | ..... | |
| 34,000 | .00810 | .00060 | ..... | ..... | |
| 35,000 | .00900 | .00090 | ..... | ..... | |
| 70,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,500 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .1750 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.15 from neck |
| Character of broken surface | | granular 90 per cent, silky 10 per cent |
| Elongation of inch sections | | ″.16, ″.19* |

## No. 7025.

Marks, $\frac{A\ 120}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 30,000 | .00105 | .00040 | ..... | ..... | Elastic limit. |
| 31,000 | .00925 | .00820 | ..... | ..... | |
| 32,000 | .00990 | .00065 | ..... | ..... | |
| 33,000 | .01100 | .00110 | ..... | ..... | |
| 34,000 | .01175 | .00075 | ..... | ..... | |
| 35,000 | .01300 | .00125 | ..... | ..... | |
| 68,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,400 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch a'ter rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do. . | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.22*, ″.18 |

## No. 7013.

Marks, $\frac{A\ 121}{P\ S\ 15.}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 25,000 | .00095 | .00035 | ..... | ..... | |
| 26,000 | .00105 | .00010 | ..... | ..... | Elastic limit. |
| 27,000 | .00165 | .00060 | ..... | ..... | |
| 28,000 | .00200 | .00035 | ..... | ..... | |
| 29,000 | .00260 | .00060 | ..... | ..... | |
| 30,000 | .00435 | .00175 | ..... | ..... | |
| 31,000 | .00540 | .00105 | ..... | ..... | |
| 32,000 | .00670 | .00130 | ..... | ..... | |
| 33,000 | .00810 | .00140 | ..... | ..... | |
| 72,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,900 |
| Elastic limit per square inch of original section | do... | 26,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | ″.60 from neck |
| Character of broken surface | | granular, dull spot at the circumference |
| Elongation of inch sections | | ″.26*, ″.14 |

## No. 7129.

Marks, $\frac{A\ 132.}{P\ S\ 15.}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 25,000 | .00105 | .00045 | ..... | ..... | Elastic limit. |
| 26,000 | .00200 | .00095 | ..... | ..... | |
| 27,000 | .00235 | .00035 | ..... | ..... | |
| 28,000 | .00335 | .00100 | ..... | ..... | |
| 29,000 | .00410 | .00075 | ..... | ..... | |
| 30,000 | .00515 | .00105 | ..... | ..... | |
| 31,000 | .00625 | .00110 | ..... | ..... | |
| 69,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,500 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .1600 |
| Elongation per inch under strain at elastic limit | ..do... | .00105 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.40 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ″.18, ″.14* |

## No. 7137.

Marks, $\frac{A\ 133}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00065 | .00040 | ..... | ..... | |
| 21,000 | .00070 | .00005 | ..... | ..... | Elastic limit. |
| 22,000 | .00090 | .00020 | ..... | ..... | |
| 23,000 | .00105 | .00015 | ..... | ..... | |
| 24,000 | .00160 | .00055 | ..... | ..... | |
| 25,000 | .00200 | .00040 | ..... | ..... | |
| 26,000 | .00275 | .00075 | ..... | ..... | |
| 27,000 | .00390 | .00115 | ..... | ..... | |
| 28,000 | .00465 | .00075 | ..... | ..... | |
| 29,000 | .00560 | .00095 | ..... | ..... | |
| 30,000 | .00660 | .00100 | ..... | ..... | |
| 67,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 67,450 |
| Elastic limit per square inch of original section | do... | 21,000 |
| Elongation per inch after rupture | inch.. | .1100 |
| Elongation per inch under strain at elastic limit | do... | .00070 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ″.90 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ″.11, ″.11* |

## No. 7016.

Marks, $\frac{A\ 125}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00030 | .00015 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 25,000 | .00090 | .00025 | ..... | ..... | |
| 27,000 | .00105 | .00015 | ..... | ..... | |
| 28,000 | .00105 | 0. | ..... | ..... | |
| 29,000 | .00110 | .00005 | ..... | ..... | Elastic limit. |
| 30,000 | .01075 | .00965 | ..... | ..... | |
| 31,000 | .01080 | .00005 | ..... | ..... | |
| 32,000 | .01100 | .00020 | ..... | ..... | |
| 33,000 | .01200 | .00100 | ..... | ..... | |
| 34,000 | .01315 | .00115 | ..... | ..... | |
| 35,000 | .01475 | .00160 | ..... | ..... | |
| 36,000 | .01550 | .00075 | ..... | ..... | |
| 62,350 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of orignal section | pounds.. | 62,350 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1000 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 18.2 |
| Position of rupture | | ″.90 from neck |
| Character of broken surface | | granular 90 per cent, dull silky 10 per cent |
| Elongation of inch sections | | ″.10*, ″.10 |

Marks, $\frac{A\ 135}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent [redacted] | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00080 | .00015 | ..... | ..... | |
| 20,000 | .00070 | .00040 | ..... | ..... | |
| 30,000 | .00115 | .00045 | ..... | ..... | |
| 31,000 | .00120 | .00005 | ..... | ..... | |
| 32,000 | .00130 | .00010 | ..... | ..... | Elastic limit. |
| | .00810 | .00680 | ..... | ..... | |
| 33,000 | .00865 | .00055 | ..... | ..... | |
| 34,000 | .00900 | .00035 | ..... | ..... | |
| 35,000 | .01050 | .00150 | ..... | ..... | |
| 36,000 | .01150 | .00100 | ..... | ..... | |
| 37,000 | .01255 | .00105 | ..... | ..... | |
| 71,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,500 |
| Elastic limit per square inch of original section | do... | 32,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do.... | .00130 |
| Reduction in diameter at point of rupture | do.... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | 1″.00 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.18*, ″.18 |

## No. 7167.

Marks, $\frac{A\ 189}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 32,000 | .00110 | .00010 | ..... | ..... | |
| 33,000 | .00120 | .00010 | ..... | ..... | Elastic limit. |
| 34,000 | .00725 | .00605 | ..... | ..... | |
| 35,000 | .00950 | .00225 | ..... | ..... | |
| 36,000 | .00980 | .00030 | ..... | ..... | |
| 37,000 | .01030 | .00050 | ..... | ..... | |
| 38,000 | .01140 | .00110 | ..... | ..... | |
| 39,000 | .01250 | .00110 | ..... | ..... | |
| 78,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 78,000 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .1850 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.60 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.16, ′.21* |

Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00065 | .00040 | ..... | ..... | |
| 21,000 | .00075 | .00010 | ..... | ..... | Elastic limit. |
| 22,000 | .00095 | .00020 | ..... | ..... | |
| 23,000 | .00125 | .00030 | ..... | ..... | |
| 24,000 | .00185 | .00060 | ..... | ..... | |
| 25,000 | .00315 | .00130 | ..... | ..... | |
| 26,000 | .00400 | .00085 | ..... | ..... | |
| 27,000 | .00610 | .00210 | ..... | ..... | |
| 28,000 | [illegible] | .00080 | ..... | ..... | |
| 29,000 | .00680 | .00040 | ..... | ..... | |
| 30,000 | .00900 | .00220 | ..... | ..... | |
| 61,960 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 61,960 |
| Elastic limit per square inch of original section | do... | 21,000 |
| Elongation per inch after rupture | inch.. | .1000 |
| Elongation per inch under strain at elastic limit | do... | .00075 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 18.2 |
| Position of rupture | | ".25 from neck |
| Character of broken surface | | granular, interspersed with silky metal |
| Elongation of inch sections | | ".09, ".11* |

## No. 7189.

Marks, $\frac{A\ 128}{2\ P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00030 | .00015 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 30,000 | .00105 | .00040 | ..... | ..... | |
| 31,000 | .00110 | .00005 | ..... | ..... | |
| 32,000 | .00115 | .00005 | ..... | ..... | Elastic limit. |
| 33,000 | .00875 | .00760 | ..... | ..... | |
| 34,000 | .00925 | .00050 | ..... | ..... | |
| 35,000 | .00975 | .00050 | ..... | ..... | |
| 36,000 | .01060 | .00085 | ..... | ..... | |
| 37,000 | .01150 | .00090 | ..... | ..... | |
| 71,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,500 |
| Elastic limit per square inch of original section | do... | 32,000 |
| Elongation per inch after rupture | inch.. | .1600 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.88 from neck |
| Character of broken surface | | granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.17*, ″.15 |

## No. 7126.

Marks, $\frac{A\ 129}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00085 | .00020 | ..... | ..... | |
| 20,000 | .00075 | .00040 | ..... | ..... | |
| 25,000 | .00100 | .00025 | ..... | ..... | |
| 26,000 | .00110 | .00010 | ..... | ..... | |
| 27,000 | .00120 | .00010 | ..... | ..... | Elastic limit. |
| 28,000 | .00145 | .00025 | ..... | ..... | |
| 29,000 | .00275 | .00130 | ..... | ..... | |
| 30,000 | .00400 | .00125 | ..... | ..... | |
| 31,000 | .00515 | .00115 | ..... | ..... | |
| 32,000 | .00625 | .00110 | ..... | ..... | |
| 33,000 | .00750 | .00125 | ..... | ..... | |
| 34,000 | .00810 | .00060 | ..... | ..... | |
| 35,000 | .00900 | .00090 | ..... | ..... | |
| 70,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,500 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .1750 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.15 from neck |
| Character of broken surface | | granular 90 per cent, silky 10 per cent |
| Elongation of inch sections | | ″.16, ″.19* |

## No. 7127.

Marks, $\overset{A\ 130}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00075 | .00040 | ..... | ..... | |
| 25,000 | .00100 | .00025 | ..... | ..... | |
| 27,000 | .00105 | .00005 | ..... | ..... | |
| 28,000 | .00110 | .00005 | ..... | ..... | |
| 29,000 | .00115 | .00005 | ..... | ..... | Elastic limit. |
| 30,000 | .00350 | .00235 | ..... | ..... | |
| 31,000 | .00750 | .00400 | ..... | ..... | |
| 32,000 | .00950 | .00200 | ..... | ..... | |
| 33,000 | .00975 | .00025 | ..... | ..... | |
| 34,000 | .01050 | .00075 | ..... | ..... | |
| 35,000 | .01150 | .00100 | ..... | ..... | |
| 69,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,900 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per square inch after rupture | inch.. | .1600 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | 1″.02 from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.15, ″.17* |

## No. 7139.

Marks, $\frac{A\ 144}{P\ S\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00030 | .00015 | ..... | ..... | |
| 18,000 | .00070 | .00040 | ..... | ..... | |
| 19,000 | .00085 | .00015 | ..... | ..... | |
| 20,000 | .00095 | .00010 | ..... | ..... | Elastic limit. |
| 21,000 | .00150 | .00055 | ..... | ..... | |
| 22,000 | .00175 | .00025 | ..... | ..... | |
| 23,000 | .00290 | .00115 | ..... | ..... | |
| 24,000 | .00375 | .00085 | ..... | ..... | |
| 25,000 | .00475 | .00100 | ..... | ..... | |
| 26,000 | .00580 | .00105 | ..... | ..... | |
| 60,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 60,400 |
| Elastic limit per square inch of original section | do... | 20,000 |
| Elongation per inch after rupture | inch.. | .1100 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ".75 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ".11, ".11* |

## No. 7129.

Marks, $\frac{A\ 132.}{P\ S\ 15.}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 25,000 | .00105 | .00045 | ..... | ..... | Elastic limit. |
| 26,000 | .00200 | .00095 | ..... | ..... | |
| 27,000 | .00235 | .00035 | ..... | ..... | |
| 28,000 | .00335 | .00100 | ..... | ..... | |
| 29,000 | .00410 | .00075 | ..... | ..... | |
| 30,000 | .00515 | .00105 | ..... | ..... | |
| 31,000 | .00625 | .00110 | ..... | ..... | |
| 69,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,500 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .1600 |
| Elongation per inch under strain at elastic limit | ..do... | .00105 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.40 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ″.18, ″.14* |

Marks, $\frac{A\ 145}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00030 | .00015 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 30,000 | .00110 | .00045 | ..... | ..... | |
| 31,000 | .00115 | .00005 | ..... | ..... | Elastic limit. |
| 32,000 | .00975 | .00860 | ..... | ..... | |
| 33,000 | .01000 | .00025 | ..... | ..... | |
| 34,000 | .01050 | 00050 | ..... | ..... | |
| 35,000 | .01125 | .00075 | ..... | ..... | |
| 36,000 | .01250 | .00125 | ..... | ..... | |
| 37,000 | .01380 | .00110 | ..... | ..... | |
| 69,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,500 |
| Elastic limit per square inch of original section | do.... | 31,000 |
| Elongation per inch after rupture | inch.. | .1950 |
| Elongation per inch under strain at elastic limit | do.... | .00115 |
| Reduction in diameter at point of rupture | do.... | .065 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.20 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.19ª, ″.20 |

## No. 7150.

Marks, $\frac{A\ 134}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00020 | .00010 | ..... | ..... | |
| 20,000 | .00060 | .00040 | ..... | ..... | |
| 29,000 | .00100 | .00040 | ..... | ..... | Elastic limit. |
| 30,000 | .00125 | .00025 | ..... | ..... | |
| | .00925 | .00800 | ..... | ..... | |
| 31,000 | .00980 | .00055 | ..... | ..... | |
| 32,000 | .01050 | .00070 | ..... | ..... | |
| 33,000 | .01150 | .00100 | ..... | ..... | |
| 34,000 | .01290 | .00140 | ..... | ..... | |
| 65,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 65,100 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1450 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | dull gray, amorphous, with trace of crystallization |
| Elongation of inch sections | | ″.16*, ″.18 |

## No. 7159.

Marks, $\frac{A\ 148}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| 25,000 | .00095 | .00025 | ..... | ..... | |
| 27,000 | .00105 | .00010 | ..... | ..... | |
| 29,000 | .00115 | .00010 | ..... | ..... | |
| 30,000 | .00125 | .00010 | ..... | ..... | Elastic limit. |
| 31,000 | .00160 | .00035 | ..... | ..... | |
| 32,000 | .00395 | .00235 | ..... | ..... | |
| 33,000 | .00835 | .00440 | ..... | ..... | |
| 34,000 | .00915 | .00080 | ..... | ..... | |
| 35,000 | .00990 | .00075 | ..... | ..... | |
| 36,000 | .01085 | .00095 | ..... | ..... | |
| 70,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,900 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .1650 |
| Elongation per inch under strain at elastic limit | do... | .00125 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.60 from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.15, ″.18* |

## No. 7167.

Marks, $\frac{A\ 139}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 32,000 | .00110 | .00010 | ..... | ..... | |
| 33,000 | .00120 | .00010 | ..... | ..... | Elastic limit. |
| 34,000 | .00725 | .00605 | ..... | ..... | |
| 35,000 | .00950 | .00225 | ..... | ..... | |
| 36,000 | .00980 | .00030 | ..... | ..... | |
| 37,000 | .01030 | .00050 | ..... | ..... | |
| 38,000 | .01140 | .00110 | ..... | ..... | |
| 39,000 | .01250 | .00110 | ..... | ..... | |
| 78,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 78,000 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .1850 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.60 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.16, ′.21* |

## No. 7184.

Marks, $\frac{A\ 150}{P\ S\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | [illegible] | Initial load. |
| 5,000 | .00015 | .00015 | [illegible] | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00065 | [illegible] | ..... | ..... | |
| 24,000 | ..... | ..... | ..... | ..... | Elastic limit, approximate. |
| 25,000 | .00125 | .00060 | ..... | ..... | |
| | .00200 | 00075 | ..... | ..... | |
| 26,000 | .00240 | [illegible] | ..... | ..... | |
| 27,000 | .00310 | 00070 | ..... | ..... | |
| 28,000 | .00440 | .00130 | ..... | ..... | |
| 29,000 | .00510 | 00070 | ..... | ..... | |
| 30,000 | .00625 | .00115 | ..... | ..... | |
| 64,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 64,900 |
| Elastic limit per square inch of original section (approximate) | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .1100 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ".55 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ".10, ".12* |

## No. 7157.

Marks, $\frac{A\ 141}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 23,000 | .00090 | .00025 | ..... | ..... | |
| 24,000 | .00095 | .00005 | ..... | ..... | |
| 25,000 | .00100 | .00005 | ..... | ..... | |
| 26,000 | .00110 | .00010 | ..... | ..... | Elastic limit. |
| 27,000 | .00200 | .00090 | ..... | ..... | |
| 28,000 | .00400 | .00200 | ..... | ..... | |
| 29,000 | .00675 | .00275 | ..... | ..... | |
| 30,000 | .00755 | .00080 | ..... | ..... | |
| 31,000 | .00850 | .00095 | ..... | ..... | |
| 32,000 | .00950 | .00100 | ..... | ..... | |
| 64,850 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 64,850 |
| Elastic limit per square inch of original section | do... | 26,000 |
| Elongation per inch after rupture | inch.. | .0950 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .025 |
| Reduction in area after rupture, per cent of original section | | 9.5 |
| Position of rupture | | 1″.05 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.09, ″.10* |

## No. 7158.

Marks, $\frac{A\ 143}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 25,000 | .00090 | .00030 | ..... | ..... | |
| 26,000 | .00095 | .00005 | ..... | ..... | |
| 27,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 28,000 | .00360 | .00260 | ..... | ..... | |
| 29,000 | .00660 | .00300 | ..... | ..... | |
| 30,000 | .00775 | .00115 | ..... | ..... | |
| 31,000 | .00900 | .00125 | ..... | ..... | |
| 32,000 | .00925 | .00025 | ..... | ..... | |
| 33,000 | .01025 | .00100 | ..... | ..... | |
| 68,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,000 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.19, ″.19* |

## No. 7140.

Marks, $\frac{A\ 145}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00080 | .00045 | ..... | ..... | |
| 21,000 | .00095 | .00015 | ..... | ..... | Elastic limit. |
| 22,000 | .00135 | .00040 | ..... | ..... | |
| 23,000 | .00180 | .00045 | ..... | ..... | |
| 24,000 | .00305 | .00125 | ..... | ..... | |
| 25,000 | .00375 | .00070 | ..... | ..... | |
| 26,000 | .00490 | .00115 | ..... | ..... | |
| 27,000 | .00550 | .00060 | ..... | ..... | |
| 64,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 64,000 |
| Elastic limit per square inch of original section | do... | 21,000 |
| Elongation per inch after rupture | inch.. | .1700 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.10 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ″.18, ″.16* |

## No. 7142.

Marks, $\frac{A\ 147}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00055 | .00030 | ..... | ..... | |
| 25,000 | .00070 | .00015 | ..... | ..... | |
| 27,000 | .00085 | .00015 | ..... | ..... | |
| 28,000 | .00095 | .00010 | ..... | ..... | Elastic limit. |
| 29,000 | .00575 | .00480 | ..... | ..... | |
| 30,000 | .00895 | .00320 | ..... | ..... | |
| 31,000 | .00920 | .00025 | ..... | ..... | |
| 32,000 | .01015 | .00095 | ..... | ..... | |
| 33,000 | .01125 | .00110 | ..... | ..... | |
| 34,000 | .01245 | .00120 | ..... | ..... | |
| 66,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,900 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .1550 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.60 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.15, ″.16* |

Marks, $\frac{84}{PY\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | [illegible] | Initial load. |
| 5,000 | .00010 | .00010 | [illegible] | ..... | |
| 10,000 | .00060 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00060 | ..... | ..... | |
| 25,000 | .00090 | .00030 | ..... | ..... | Elastic limit. |
| 26,000 | .00120 | .00030 | ..... | ..... | |
| 27,000 | .00145 | .00025 | ..... | ..... | |
| 28,000 | .00170 | .00025 | ..... | ..... | |
| 29,000 | .00210 | .00040 | ..... | ..... | |
| 30,000 | .00260 | .00050 | ..... | ..... | |
| 31,000 | .00350 | .00090 | ..... | ..... | |
| 32,000 | .00430 | .00080 | ..... | ..... | |
| 75,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds... | 75,100 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .1960 |
| Elongation per inch under strain at elastic limit | do... | .00090 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ".75 from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ".24", ".15 |

## No. 7152.

Marks, $\frac{A\ 149}{P\ S\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00020 | .00010 | ..... | ..... | |
| 20,000 | .00055 | .00035 | ..... | ..... | |
| 28,000 | .00095 | .00040 | ..... | ..... | Elastic limit. |
| 29,000 | .00700 | .00605 | ..... | ..... | |
| 30,000 | .00800 | .00100 | ..... | ..... | |
| 31,000 | .00875 | .00075 | ..... | ..... | |
| 32,000 | .01000 | .00125 | ..... | ..... | |
| 33,000 | .01200 | .00200 | ..... | ..... | |
| 68,350 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,350 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ".9 from neck |
| Character of broken surface | | granular, with irregular section of silky metal across surface |
| Elongation of inch sections | | ".16, ".20* |

## No. 6796.

Marks, $\frac{S\ 6}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00025 | .00020 | ..... | ..... | |
| 20,000 | .00055 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00045 | ..... | ..... | Elastic limit. |
| | .00740 | .00640 | ..... | ..... | |
| 31,000 | .00795 | .00055 | ..... | ..... | |
| 32,000 | .00845 | .00050 | ..... | ..... | |
| 33,000 | .00945 | .00100 | ..... | ..... | |
| 34,000 | .01050 | .00105 | ..... | ..... | |
| 35,000 | .01125 | .00075 | ..... | ..... | |
| 72,800 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,800 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .2350 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | 1″.2 from neck |
| Character of broken surface | | granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.21, ″.26* |

## No. 7185.

Marks, $\frac{A\ 151}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| 22,000 | .00075 | .00005 | ..... | ..... | |
| 23,000 | .00085 | .00010 | ..... | ..... | Elastic limit. |
| 24,000 | .00105 | .00020 | ..... | ..... | |
| 25,000 | .00175 | .00070 | ..... | ..... | |
| 26,000 | .00250 | .00075 | ..... | ..... | |
| 27,000 | .00475 | .00225 | ..... | ..... | |
| 28,000 | .00575 | .00100 | ..... | ..... | |
| 29,000 | .00675 | .00100 | ..... | ..... | |
| 30,000 | .00775 | .00100 | ..... | ..... | |
| 53,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 53,950 |
| Elastic limit per square inch of original section | do... | 23,000 |
| Elongation per inch after rupture | inch.. | .0850 |
| Elongation per inch under strain at elastic limit | do... | .00085 |
| Reduction in diameter at point of rupture | do... | .015 |
| Reduction in area after rupture, per cent of original section | | 5.7 |
| Position of rupture | | ″.50 from neck |
| Character of broken surface | | granular silvery lustre 60 per cent, silky flaky 40 per cent |
| Elongation of inch sections | | ″.03, ″.04* |

Marks, $^{87}_{2\,P\,Y\,15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0 | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00020 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00040 | ..... | ..... | |
| 26,000 | .00080 | .00020 | ..... | ..... | |
| 27,000 | .00085 | .00005 | ..... | ..... | Elastic limit. |
| 28,000 | .00170 | .00085 | ..... | ..... | |
| 29,000 | .00500 | .00330 | ..... | ..... | |
| 30,000 | .00725 | .00225 | ..... | ..... | |
| 31,000 | .00825 | .00100 | ..... | ..... | |
| 32,000 | .00900 | .00075 | ..... | ..... | |
| 70,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,550 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .2250 |
| Elongation per inch under strain at elastic limit | do... | .00085 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | 1",2 from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ",25*, ",20 |

# PIVOT YOKES—15-POUNDER MOUNTS.

## STEEL CASTINGS.

Marks, $\frac{8\,9}{P\ Y\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00020 | .00020 | 0. | ..... | |
| 10,000 | .00040 | .00020 | ..... | ..... | |
| 20,000 | .00070 | .00030 | ..... | ..... | |
| 25,000 | .00095 | .00025 | ..... | ..... | |
| 26,000 | .00100 | .00005 | ..... | ..... | |
| 27,000 | .00105 | .00005 | ..... | ..... | |
| 28,000 | .00115 | .00010 | ..... | ..... | Elastic limit. |
| 29,000 | .00750 | .00635 | ..... | ..... | |
| 30,000 | .00810 | .00060 | ..... | ..... | |
| 31,000 | .00850 | .00040 | ..... | ..... | |
| 32,000 | .00950 | .00100 | ..... | ..... | |
| 33,000 | .01050 | .00100 | ..... | ..... | |
| 34,000 | .01175 | .00125 | ..... | ..... | |
| 35,000 | .01265 | .00090 | ..... | ..... | |
| 69,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,600 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .2800 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | 1".16 from neck |
| Character of broken surface | | fine granular, silky spot at the circumference |
| Elongation of inch sections | | ".28, ".28* |

## No. 6613.

Marks, $\overset{S\,1}{P\,Y\,15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 27,000 | .00090 | .00030 | ..... | ..... | |
| 28,000 | .00100 | .00010 | ..... | ..... | Elastic limit. |
| 29,000 | .00575 | .00475 | ..... | ..... | |
| 30,000 | .00900 | .00325 | ..... | ..... | |
| 31,000 | .01150 | .00250 | ..... | ..... | |
| 32,000 | .01250 | .00100 | ..... | ..... | |
| 33,000 | .01450 | .00200 | ..... | ..... | |
| 59,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 59,100 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .1300 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | dull gray, amorphous |
| Elongation of inch sections | | ″.12, ″.14* |

## No. 6765.

Marks, $\frac{S\ 4}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 25,000. | .00090 | .00030 | ..... | ..... | Elastic limit. |
| 26,000 | .00120 | .00030 | ..... | ..... | |
| 27,000 | .00145 | .00025 | ..... | ..... | |
| 28,000 | .00170 | .00025 | ..... | ..... | |
| 29,000 | .00210 | .00040 | ..... | ..... | |
| 30,000 | .00260 | .00050 | ..... | ..... | |
| 31,000 | .00350 | .00090 | ..... | ..... | |
| 32,000 | .00430 | .00080 | ..... | ..... | |
| 75.100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 75,100 |
| Elastic limit per square inch of original section | do.... | 25,000 |
| Elongation per inch after rupture | inch.. | .1950 |
| Elongation per inch under strain at elastic limit | do.... | .00090 |
| Reduction in diameter at point of rupture | do.... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.24*, ″.15 |

## No. 6779.

Marks, $\overset{S\,5}{P\,Y\,15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 32,000 | .00110 | .00010 | ..... | ..... | |
| 33,000 | .00120 | .00010 | ..... | ..... | Elastic limit. |
| 34,000 | .00225 | .00105 | ..... | ..... | |
| 36,000 | .00750 | .00525 | ..... | ..... | |
| 37,000 | .00960 | .00230 | ..... | ..... | |
| 38,000 | .01025 | .00045 | ..... | ..... | |
| 39,000 | .01100 | .00075 | ..... | ..... | |
| 77,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 77,100 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .1960 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | ″.70 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.18, ″.21* |

Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 33,000 | .00110 | .00010 | ..... | ..... | Elastic limit. |
| | .01000 | .00890 | ..... | ..... | |
| 34,000 | .01050 | .00050 | ..... | ..... | |
| 35,000 | .01175 | .00125 | ..... | ..... | |
| 36,000 | .01250 | .00075 | ..... | ..... | |
| 37,000 | .01330 | .00080 | ..... | ..... | |
| 38,000 | .01420 | .00120 | ..... | ..... | |
| 71,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,500 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1" from neck |
| Character of broken surface | | fine granular, silky spot at the circumference |
| Elongation of inch sections | | ".19*, ".17 |

## No. 6815.

Marks, $\overset{S\ 7}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 15,000 | .00045 | .00020 | ..... | ..... | |
| 17,000 | .00055 | .00010 | ..... | ..... | |
| 18,000 | .00060 | .00005 | ..... | ..... | |
| 19,000 | .00065 | .00005 | ..... | ..... | |
| 20,000 | .00070 | .00005 | ..... | ..... | Elastic limit. |
| 21,000 | .00090 | .00020 | ..... | ..... | |
| 22,000 | .00120 | .00030 | ..... | ..... | |
| 23,000 | .00165 | .00045 | ..... | ..... | |
| 24,000 | .00250 | .00085 | ..... | ..... | |
| 25,000 | .00400 | .00150 | ..... | ..... | |
| 26,000 | .00490 | .00090 | ..... | ..... | |
| 27,000 | .00555 | .00065 | ..... | ..... | |
| 28,000 | .00675 | .00120 | ..... | ..... | |
| 29,000 | .00760 | .00085 | ..... | ..... | |
| 65,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 65,000 |
| Elastic limit per square inch of original section | do... | 20,000 |
| Elongation per inch after rupture | inch.. | .1650 |
| Elongation per inch under strain at elastic limit | do... | .00070 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.85 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ″.17*, ″.16 |

Marks, $\frac{S\ 17}{P\ Y\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00080 | .00045 | ..... | ..... | Elastic limit. |
| 21,000 | .00120 | .00040 | ..... | ..... | |
| 22,000 | .00190 | .00070 | ..... | ..... | |
| 23,000 | .00300 | .00110 | ..... | ..... | |
| 24,000 | .00410 | .00110 | ..... | ..... | |
| 25,000 | .00550 | .00140 | ..... | ..... | |
| 62,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 62,400 |
| Elastic limit per square inch of original section | do... | 20,000 |
| Elongation per inch after rupture | inch.. | .1650 |
| Elongation per inch under strain of elastic limit | do... | .00080 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | 1" from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | .15, .17 |

## No. 6816.

Marks, $\overset{S\ S}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00020 | .00010 | ..... | ..... | |
| 20,000 | .00060 | .00040 | ..... | ..... | |
| 30,000 | .00105 | .00045 | ..... | ..... | |
| 31,000 | .00105 | 0. | ..... | ..... | |
| 32,000 | .00110 | .00005 | ..... | ..... | |
| 33,000 | .00120 | .00010 | ..... | ..... | Elastic limit. |
| 34,000 | .01050 | .00930 | ..... | ..... | |
| 35,000 | .01110 | .00060 | ..... | ..... | |
| 36,000 | .01200 | .00090 | ..... | ..... | |
| 37,000 | .01295 | .00095 | ..... | ..... | |
| 38,000 | .01415 | .00120 | ..... | ..... | |
| 39,000 | .01550 | .00135 | ..... | ..... | |
| 40,000 | .01650 | .00100 | ..... | ..... | |
| 72,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,000 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .2650 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 84.0 |
| Position of rupture | | 1″.20 from neck |
| Character of broken surface | | fine granular, silky spot at the circumference |
| Elongation of inch sections | | ″.28, ″.25* |

Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | [illegible] | 0. | ..... | |
| 10,000 | .00035 | [illegible] | ..... | ..... | |
| 20,000 | .00065 | [illegible] | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 31,000 | .00110 | 00010 | ..... | ..... | Elastic limit. |
| 32,000 | .00135 | .00025 | ..... | ..... | |
| 33,000 | .00950 | .00815 | ..... | ..... | |
| 34,000 | .00985 | .00035 | ..... | ..... | |
| 35,000 | .01050 | .00065 | ..... | ..... | |
| 36,000 | 01150 | 00100 | ..... | ..... | |
| 74,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 74,000 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .2500 |
| Elongation per inch under strain at elastic limit | do... | 00110 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 34.0 |
| Position of rupture | | 1".2 from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ".22", ".22 |

## No. 6818.

**Marks,** $\overset{S\ 10}{P\ Y\ 15}$
**Diameter, ".505.**
**Sectional area, .20 square inch.**
**Gauged length, 2".**

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00085 | .00020 | ..... | ..... | |
| 20,000 | .00070 | .00085 | ..... | ..... | |
| 25,000 | .00090 | .00020 | ..... | ..... | |
| 26,000 | .00095 | .00005 | ..... | ..... | |
| 27,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 28,000 | .00130 | .00030 | ..... | ..... | |
| 29,000 | .00660 | .00530 | ..... | ..... | |
| 30,000 | .00750 | .00090 | ..... | ..... | |
| 31,000 | .00790 | .00040 | ..... | ..... | |
| 32,000 | .00895 | .00105 | ..... | ..... | |
| 33,000 | .01000 | .00105 | ..... | ..... | |
| 34,000 | .01075 | .00075 | ..... | ..... | |
| 35,000 | .01175 | .00100 | ..... | ..... | |
| 71,000 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,000 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .2150 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ".95 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ".19, ".24* |

## No. 6833.

Marks, $\overset{S\ 11}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00040 | .00025 | ..... | ..... | |
| 20,000 | .00075 | .00035 | ..... | ..... | |
| 25,000 | .00100 | .00025 | ..... | ..... | |
| 26,000 | .00100 | 0. | ..... | ..... | |
| 27,000 | .00105 | .00005 | ..... | ..... | |
| 28,000 | .00115 | .00010 | ..... | ..... | Elastic limit. |
| 29,000 | .00575 | .00460 | ..... | ..... | |
| 30,000 | .00640 | .00065 | ..... | ..... | |
| 31,000 | .00760 | .00120 | ..... | ..... | |
| 32,000 | .00815 | .00055 | ..... | ..... | |
| 33,000 | .00910 | .00095 | ..... | ..... | |
| 34,000 | .01000 | .00090 | ..... | ..... | |
| 35,000 | .01085 | .00085 | ..... | ..... | |
| 36,000 | .01175 | .00090 | ..... | ..... | |
| 72,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,500 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | ..... | 23.9 |
| Position of rupture | | ″.80 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.22, ″.18 |

## No. 6834.

Marks, $\overset{8\ 12}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 25,000 | .00090 | .00025 | ..... | ..... | |
| 27,000 | .00100 | .00010 | ..... | ..... | |
| 28,000 | .00100 | 0. | ..... | ..... | |
| 29,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 30,000 | .00710 | .00605 | ..... | ..... | |
| 31,000 | .00910 | .00200 | ..... | ..... | |
| 32,000 | .00925 | .00015 | ..... | ..... | |
| 33,000 | .00950 | .00025 | ..... | ..... | |
| 34,000 | .01050 | .00100 | ..... | ..... | |
| 35,000 | .01125 | .00075 | ..... | ..... | |
| 36,000 | .01250 | .00125 | ..... | ..... | |
| 37,000 | .01350 | .00100 | ..... | ..... | |
| 71,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,550 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | 1″.22 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.23*, ″.13 |

Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | [illegible] | ..... | |
| 10,000 | [illegible] | .00025 | ..... | ..... | |
| 20,000 | [illegible] | .00025 | ..... | ..... | |
| 30,000 | [illegible] | .00040 | ..... | ..... | |
| 32,000 | [illegible] | .00010 | ..... | ..... | Elastic limit. |
| 33,000 | [illegible] | .00590 | ..... | ..... | |
| 34,000 | [illegible] | .00100 | ..... | ..... | |
| 35,000 | .00845 | .00045 | ..... | ..... | |
| 36,000 | .00900 | .00055 | ..... | ..... | |
| 37,000 | .00975 | .00075 | ..... | ..... | |
| 79,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 79,100 |
| Elastic limit per square inch of original section | do.... | 32,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do.... | .00110 |
| Reduction in diameter at point of rupture | do.... | .065 |
| Reduction in area after rupture, per cent of original section | | 28.9 |
| Position of rupture | | ".5 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ".17, ".29* |

## No. 6887.

Marks, $\begin{matrix} S\ 16 \\ P\ Y\ 15 \end{matrix}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00095 | .00035 | ..... | ..... | |
| 32,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 33,000 | .00940 | .00840 | ..... | ..... | |
| 34,000 | .01000 | .00060 | ..... | ..... | |
| 35,000 | .01050 | .00050 | ..... | ..... | |
| 36,000 | .01150 | .00100 | ..... | ..... | |
| 37,000 | .01250 | .00100 | ..... | ..... | |
| 71,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,000 |
| Elastic limit per square inch of original section | do... | 32,000 |
| Elongation per inch after rupture | inch.. | .1950 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.18, ″.21* |

## No. 6888.

Marks, $\overset{S\ 17}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00080 | .00045 | ..... | ..... | Elastic limit. |
| 21,000 | .00120 | .00040 | ..... | ..... | |
| 22,000 | .00190 | .00070 | ..... | ..... | |
| 23,000 | .00300 | .00110 | ..... | ..... | |
| 24,000 | .00410 | .00110 | ..... | ..... | |
| 25,000 | .00550 | .00140 | ..... | ..... | |
| 62,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 62,400 |
| Elastic limit per square inch of original section | do... | 20,000 |
| Elongation per inch after rupture | inch.. | .1650 |
| Elongation per inch under strain of elastic limit | do... | .00080 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | 1.″ from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ″.16, ″.17* |

## No. 6907.

Marks, $\overset{S\ 17}{2\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | ..... | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| 30,000 | .00110 | .00040 | ..... | ..... | |
| 31,000 | .00115 | .00005 | ..... | ..... | |
| 32,000 | .00115 | 0. | ..... | ..... | Elastic limit. |
| 33,000 | .00985 | .00870 | ..... | ..... | |
| 34,000 | .01010 | .00025 | ..... | ..... | |
| 35,000 | .01060 | .00070 | ..... | ..... | |
| 36,000 | .01160 | .00080 | ..... | ..... | |
| 37,000 | .01255 | .00095 | ..... | ..... | |
| 38,000 | .01375 | .00120 | ..... | ..... | |
| 39,000 | .01450 | .00075 | ..... | ..... | |
| 40,000 | .01600 | .00150 | ..... | ..... | |
| 69,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,450 |
| Elastic limit per square inch of original section | do... | 82,000 |
| Elongation per inch after rupture | inch.. | .1000 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .025 |
| Reduction in area after rupture, per cent of original section | | 9.5 |
| Position of rupture | | at the neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.10, ″.10* |

## No. 6920.

Marks, $\overset{S\ 17}{3\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 31,000 | .00110 | .00010 | ..... | ..... | Elastic limit. |
| 32,000 | .00135 | .00025 | ..... | ..... | |
| 33,000 | .00950 | .00815 | ..... | ..... | |
| 34,000 | .00985 | .00035 | ..... | ..... | |
| 35,000 | .01050 | .00065 | ..... | ..... | |
| 36,000 | .01150 | .00100 | ..... | ..... | |
| 74,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 74,000 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .2500 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 84.0 |
| Position of rupture | | 1″.2 from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.28*, ″.22 |

## No. 6890.

Marks, $\overset{S\ 18}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | ..... | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 25,000 | .00085 | .00025 | ..... | ..... | |
| 26,000 | .00095 | .00010 | ..... | ..... | Elastic limit. |
| 27,000 | .00550 | .00455 | ..... | ..... | |
| 28,000 | .00635 | .00085 | ..... | ..... | |
| 29,000 | .00750 | .00115 | ..... | ..... | |
| 30,000 | .00825 | .00075 | ..... | ..... | |
| 31,000 | .00915 | .00090 | ..... | ..... | |
| 66,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,000 |
| Elastic limit per square inch of original section | do... | 26,000 |
| Elongation per inch after rupture | inch.. | .1100 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ″.65 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ″.10, ″12* |

Marks, $\frac{S\ 28}{P\ Y\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00105 | .00040 | ..... | ..... | Elastic limit. |
| 31,000 | .00135 | .00030 | ..... | ..... | |
| 32,000 | .00700 | .00565 | ..... | ..... | |
| 33,000 | .00800 | .00100 | ..... | ..... | |
| 34,000 | .00850 | .00050 | ..... | ..... | |
| 35,000 | .00915 | .00065 | ..... | ..... | |
| 77,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 77,000 |
| Elastic limit per square inch of original section | do.... | 30,000 |
| Elongation per inch after rupture | inch.. | .2250 |
| Elongation per inch under strain at elastic limit | do.... | .00105 |
| Reduction in diameter at point of rupture | do.... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | .1" from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ".24", ".21 |

## No. 6889.

Marks, $\frac{S\ 19}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00105 | .00040 | ..... | ..... | |
| 34,000 | .00115 | .00010 | ..... | ..... | Elastic limit. |
| 35,000 | .00135 | .00020 | ..... | ..... | |
| 36,000 | .01000 | .00865 | ..... | ..... | |
| 37,000 | .01085 | .00085 | ..... | ..... | |
| 38,000 | .01160 | .00075 | ..... | ..... | |
| 39,000 | .01275 | .00115 | ..... | ..... | |
| 77,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 77,000 |
| Elastic limit per square inch of original section | do... | 34,000 |
| Elongation per inch after rupture | inch.. | .2250 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | 1″.14 from neck |
| Character of broken surface | | granular 70 per cent, silky 30 per cent |
| Elongation of inch sections | | ″.20, ″.25* |

## No. 6891.

Marks, $\overset{S\ 20}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 32,000 | .00110 | .00010 | ..... | ..... | Elastic limit. |
| 33,000 | .00700 | .00590 | ..... | ..... | |
| 34,000 | .00800 | .00100 | ..... | ..... | |
| 35,000 | .00845 | .00045 | ..... | ..... | |
| 36,000 | .00900 | .00055 | ..... | ..... | |
| 37,000 | .00975 | .00075 | ..... | ..... | |
| 79,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 79,100 |
| Elastic limit per square inch of original section | do... | 32,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | ″.5 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.17, ″.28* |

## No. 6892.

Marks, $\frac{S\ 21}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00090 | .00030 | ..... | ..... | |
| 31,000 | .00100 | .00010 | ..... | ..... | Elastic limit. |
| 32,000 | .00800 | .00700 | ..... | ..... | |
| 33,000 | .00900 | .00100 | ..... | ..... | |
| 34,000 | .00940 | .00040 | ..... | ..... | |
| 35,000 | .01000 | .00060 | ..... | ..... | |
| 36,000 | .01150 | .00150 | ..... | ..... | |
| 73,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 73,050 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .2550 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 84.0 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | silky 70 per cent, granular 30 per cent |
| Elongation of inch sections | | ″.30*, ″.21 |

## No. 6893.

Marks, $\frac{S\ 22}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 30,000 | .00095 | .00035 | ..... | ..... | |
| 33,000 | .00105 | .00010 | ..... | ..... | |
| 34,000 | .00110 | .00005 | ..... | ..... | Elastic limit. |
| 35,000 | .00950 | .00840 | ..... | ..... | |
| 36,000 | .01025 | .00075 | ..... | ..... | |
| 37,000 | .01125 | .00100 | ..... | ..... | |
| 38,000 | .01180 | .00055 | ..... | ..... | |
| 39,000 | .01290 | .00110 | ..... | ..... | |
| 75,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 75,400 |
| Elastic limit per square inch of original section | do... | 34,000 |
| Elongation per inch after rupture | inch.. | .2400 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 34.0 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky 70 per cent, granular 30 per cent |
| Elongation of inch sections | | ″.21*, ″.27* |

## No. 6894.

Marks, $\overset{S\ 23}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 31,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 32,000 | .00450 | .00345 | ..... | ..... | |
| 33,000 | .00750 | .00300 | ..... | ..... | |
| 34,000 | .00860 | .00110 | ..... | ..... | |
| 35,000 | .00930 | .00070 | ..... | ..... | |
| 36,000 | .01020 | .00090 | ..... | ..... | |
| 73,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 73,600 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .2500 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | silky 60 per cent, granular 40 per cent |
| Elongation of inch sections | | ″.20, ″.30* |

## No. 6905.

Marks, $\overset{S\ 24}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 33,000 | .00115 | .00015 | ..... | ..... | Elastic limit. |
| 34,000 | .01025 | .00910 | ..... | ..... | |
| 35,000 | .01115 | .00090 | ..... | ..... | |
| 36,000 | .01200 | .00085 | ..... | ..... | |
| 37,000 | .01300 | .00100 | ..... | ..... | |
| 38,000 | .01450 | .00150 | ..... | ..... | |
| 72,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,500 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .2650 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 34.0 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular 55 per cent, silky 45 per cent |
| Elongation of inch sections | | ″.28*, ″.25* |

## No. 6906.

Marks, $\frac{S\ 25}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00150 | .00090 | ..... | ..... | |
| 32,000 | .00160 | .00010 | ..... | ..... | Elastic limit. |
| 33,000 | .00175 | .00015 | ..... | ..... | |
| | .00700 | .00525 | ..... | ..... | |
| 34,000 | .00790 | .00090 | ..... | ..... | |
| 35,000 | .00875 | .00085 | ..... | ..... | |
| 36,000 | .00930 | .00055 | ..... | ..... | |
| 37,000 | .01000 | .00070 | ..... | ..... | |
| 78,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 78,550 |
| Elastic limit per square inch of original section | do... | 32,000 |
| Elongation per inch after rupture | inch.. | .2150 |
| Elongation per inch under strain at elastic limit | do... | .00160 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ″.19, ″.24* |

## No. 6928.

Marks, $\frac{S\ 32}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 29,000 | .00100 | .00035 | ..... | ..... | Elastic limit. |
| 30,000 | .00690 | .00590 | ..... | ..... | |
| 31,000 | .00815 | .00125 | ..... | ..... | |
| 32,000 | .00900 | .00085 | ..... | ..... | |
| 33,000 | .00970 | .00070 | ..... | ..... | |
| 34,000 | .01060 | .00090 | ..... | ..... | |
| 70,300 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,300 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1750 |
| Elongation per inch under strain at elastic limit | do... | .00109 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | granular, silvery luster |
| Elongation of inch sections | | ″.19*, ″.16 |

## No. 6929.

Marks, $\frac{S\ 33}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00105 | .00040 | ..... | ..... | Elastic limit. |
| 31,000 | .00475 | .0370 | ..... | ..... | |
| 32,000 | .00550 | .0075 | ..... | ..... | |
| 33,000 | .00635 | .0085 | ..... | ..... | |
| 34,000 | .00740 | .0105 | ..... | ..... | |
| 35,000 | .00800 | .0060 | ..... | ..... | |
| 79,500 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 79,500 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .1750 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.19*, ″.16* |

## No. 6915.

Marks, $\frac{S\ 28}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00055 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00045 | ..... | ..... | Elastic limit. |
| 31,000 | .00550 | .00450 | ..... | ..... | |
| 32,000 | .00675 | .00125 | ..... | ..... | |
| 33,000 | .00715 | .00040 | ..... | ..... | |
| 34,000 | .00800 | .00085 | ..... | ..... | |
| 35,000 | .00900 | .00100 | ..... | ..... | |
| 77,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 77,600 |
| Elastic limit per square inch of orginal section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .2100 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.20*, ″.22* |

## No. 6921.

Marks, $\overset{S\ 29}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00095 | .00035 | ..... | ..... | Elastic limit. |
| 31,000 | .00735 | .00640 | ..... | ..... | |
| 32,000 | .00800 | .00065 | ..... | ..... | |
| 33,000 | .00900 | .00100 | ..... | ..... | |
| 34,000 | .01010 | .00110 | ..... | ..... | |
| 35,000 | .01100 | .00090 | ..... | ..... | |
| 78,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 78,600 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .2100 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | 1″.06 from neck |
| Character of broken surface | | granular 60 per cent, dull silky 40 per cent |
| Elongation of inch sections | | ″.19, ″.23* |

## No. 6925.

Marks, $\frac{S\ 30}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 31,000 | .00105 | .00005 | ..... | ..... | |
| 32,000 | .00115 | .00010 | ..... | ..... | Elastic limit. |
| 33,000 | .00740 | .00625 | ..... | ..... | |
| 34,000 | .00840 | .00100 | ..... | ..... | |
| 35,000 | .00890 | .00050 | ..... | ..... | |
| 36,000 | .00965 | .00075 | ..... | ..... | |
| 37,000 | .01050 | .00085 | ..... | ..... | |
| 76,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 76,550 |
| Elastic limit per square inch of original section | do... | 82,000 |
| Elongation per inch after rupture | inch.. | .2060 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | granular, with silky spots |
| Elongation of inch sections | | ″.19, ″.22* |

## No. 6927.

Marks, $\overset{S\ 31}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00110 | .00045 | ..... | ..... | |
| 36,000 | .00130 | .00020 | ..... | ..... | |
| 37,000 | .00140 | .00010 | ..... | ..... | Elastic limit. |
| 38,000 | .00190 | .00050 | ..... | ..... | |
| 39,000 | .00750 | .00560 | ..... | ..... | |
| 40,000 | .00810 | .00060 | ..... | ..... | |
| 41,000 | .00880 | .00070 | ..... | ..... | |
| 42,000 | .00940 | .00060 | ..... | ..... | |
| 43,000 | .01000 | .00060 | ..... | ..... | |
| 87,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 87,100 |
| Elastic limit per square inch of original section | do... | 37,000 |
| Elongation per inch after rupture | inch.. | .1950 |
| Elongation per inch under strain at elastic limit | do... | .00140 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | fine granular |
| Elongation of inch sections | | ″.22*, ″.17 |

## No. 6928.

Marks, $\overset{S\ 82}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 29,000 | .00100 | .00035 | ..... | ..... | Elastic limit. |
| 30,000 | .00690 | .00590 | ..... | ..... | |
| 31,000 | .00815 | .00125 | ..... | ..... | |
| 32,000 | .00900 | .00085 | ..... | ..... | |
| 33,000 | .00970 | .00070 | ..... | ..... | |
| 34,000 | .01060 | .00090 | ..... | ..... | |
| 70,300 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,300 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1750 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | granular, silvery luster |
| Elongation of inch sections | | ″.19*, ″.16 |

## No. 6929.

Marks, $\frac{S\ 33}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00105 | .00040 | ..... | ..... | Elastic limit. |
| 31,000 | .00475 | .0370 | ..... | ..... | |
| 32,000 | .00550 | .0075 | ..... | ..... | |
| 33,000 | .00635 | .0085 | ..... | ..... | |
| 34,000 | .00740 | .0105 | ..... | ..... | |
| 35,000 | .00800 | .0060 | ..... | ..... | |
| 79,500 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 79,500 |
| Elastic limit per square inch of original section | do... | 80,000 |
| Elongation per inch after rupture | inch.. | .1750 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.19*, ″.16* |

## No. 6930.

Marks, $\frac{S\ 34}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | Elastic limit. |
| 31,000 | .00600 | .00500 | ..... | ..... | |
| 32,000 | .00685 | .00085 | ..... | ..... | |
| 33,000 | .00750 | .00065 | ..... | ..... | |
| 34,000 | .00800 | .00050 | ..... | ..... | |
| 35,000 | .00900 | .00100 | ..... | ..... | |
| 76,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 76,450 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.17, ″.21* |

## No. 6931.

Marks, $\frac{S\ 35}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 27,000 | .00095 | .00030 | ..... | ..... | Elastic limit. |
| 28,000 | .00300 | .00205 | ..... | ..... | |
| 29,000 | .00800 | .00500 | ..... | ..... | |
| 30,000 | .00900 | .00100 | ..... | ..... | |
| 31,000 | .00965 | .00065 | ..... | ..... | |
| 32,000 | .01100 | .00135 | ..... | ..... | |
| 64,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 64,000 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .1050 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ″.4 from neck |
| Character of broken surface | | granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.10, ″.11* |

## No. 6964.

Marks, $\frac{S\ 35}{2\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 28,000 | .00090 | .00030 | ..... | ..... | |
| 29,000 | .00095 | .00005 | ..... | ..... | Elastic limit. |
| 30,000 | .00550 | .00455 | ..... | ..... | |
| 31,000 | .00630 | .00080 | ..... | ..... | |
| 32,000 | .00690 | .00060 | ..... | ..... | |
| 33,000 | .00750 | .00060 | ..... | ..... | |
| 34,000 | .00825 | .00075 | ..... | ..... | |
| 77,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 77,400 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.21*, ″.17 |

## No. 6978.

Marks, $\overset{S\ 35}{S\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 36,000 | .00140 | .00040 | ..... | ..... | |
| 37,000 | .00145 | .00005 | ..... | ..... | |
| 38,000 | .00150 | .00005 | ..... | ..... | Elastic limit. |
| 39,000 | .00740 | .00590 | ..... | ..... | |
| 40,000 | .00785 | .00045 | ..... | ..... | |
| 41,000 | .00825 | .00040 | ..... | ..... | |
| 42,000 | .00865 | .00040 | ..... | ..... | |
| 43,000 | .00950 | .00085 | ..... | ..... | |
| 88,600 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 88,600 |
| Elastic limit per square inch of original section | do... | 38,000 |
| Elongation per inch after rupture | inch.. | .1400 |
| Elongation per inch under strain at elastic limit | do... | .00150 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ″.15 from neck |
| Character of broken surface | | fine granular |
| Elongation of inch sections | | ″.16*, ″.12 |

## No. 6947.

Marks, $\overset{S\ 36}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 28,000 | .00090 | .00030 | ..... | ..... | Elastic limit. |
| 29,000 | .00510 | .00420 | ..... | ..... | |
| 30,000 | .00625 | .00115 | ..... | ..... | |
| 31,000 | .00705 | .00080 | ..... | ..... | |
| 32,000 | .00800 | .00095 | ..... | ..... | |
| 33,000 | .00875 | .00075 | ..... | ..... | |
| 73,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 73,100 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00090 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.19*, ″.17 |

## No. 6965.

Marks, $\frac{S\ 38}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00095 | .00030 | ..... | ..... | |
| 31,000 | .00105 | .00010 | ..... | ..... | Elastic limit. |
| 32,000 | .00855 | .00750 | ..... | ..... | |
| 33,000 | .00900 | .00045 | ..... | ..... | |
| 34,000 | .00990 | .00090 | ..... | ..... | |
| 35,000 | .01065 | .00075 | ..... | ..... | |
| 36,000 | .01150 | .00085 | ..... | ..... | |
| 73,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 73,500 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.20*, ″.18 |

## No. 6950.

Marks, $\frac{S\ 40}{P.\ Y.\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | Elastic limit. |
| 31,000 | .00960 | .00860 | ..... | ..... | |
| 32,000 | .01075 | .00095 | ..... | ..... | |
| 33,000 | .01160 | .00085 | ..... | ..... | |
| 34,000 | .01260 | .00100 | ..... | ..... | |
| 35,000 | .01400 | .00140 | ..... | ..... | |
| 67,250 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 67,250 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .1350 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.20*, ″.17 |

## No. 6951.

Marks, $\frac{S\ 42}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | Elastic limit. |
| 31,000 | .00875 | .00775 | ..... | ..... | |
| 32,000 | .00950 | .00075 | ..... | ..... | |
| 33,000 | .01050 | .00100 | ..... | ..... | |
| 34,000 | .01150 | .00100 | ..... | ..... | |
| 35,000 | .01250 | .00100 | ..... | ..... | |
| 67,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 67,900 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .1550 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | 1″.05 from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.14, ″.17* |

## No. 6952.

Marks, $\frac{S\ 43}{P.\ Y.\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00080 | ..... | ..... | |
| 30,000 | .00105 | .00040 | ..... | ..... | Elastic limit. |
| 31,000 | .00675 | .00570 | ..... | ..... | |
| 32,000 | .00740 | .00065 | ..... | ..... | |
| 33,000 | .00810 | .00070 | ..... | ..... | |
| 34,000 | .00900 | .00090 | ..... | ..... | |
| 35,000 | .00990 | .00090 | ..... | ..... | |
| 73,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 73,900 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .1850 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular 70 per cent, silky 30 per cent |
| Elongation of inch sections | | ″.18, ″.19* |

## No. 6973.

Marks, $\frac{S\ 45}{P.\ Y.\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 35,000 | .00135 | .00035 | ..... | ..... | Elastic limit. |
| | .00450 | .00315 | ..... | ..... | |
| 36,000 | .00705 | .00255 | ..... | ..... | |
| 37,000 | .00760 | .00055 | ..... | ..... | |
| 38,000 | .00840 | .00080 | ..... | ..... | |
| 39,000 | .00900 | .00060 | ..... | ..... | |
| 40,000 | .00980 | .00080 | ..... | ..... | |
| 69,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,550 |
| Elastic limit per square inch of original section | do... | 35,000 |
| Elongation per inch after rupture | inch.. | .0550 |
| Elongation per inch under strain at elastic limit | do... | .00135 |
| Reduction in diameter at point of rupture | do... | .025 |
| Reduction in area after rupture, per cent of original section | | 9.5 |
| Position of rupture | | ".9 from neck |
| Character of broken surface | | granular, cavity ".08 diameter at the circumference |
| Elongation of inch sections | | ".05, ".06* |

## No. 6993.

Marks, $\frac{S\ 45}{2\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00095 | .00035 | ..... | ..... | |
| 35,000 | .00120 | .00025 | ..... | ..... | Elastic limit. |
| 36,000 | .00495 | .00375 | ..... | ..... | |
| 37,000 | .00590 | .00095 | ..... | ..... | |
| 38,000 | .00680 | .00090 | ..... | ..... | |
| 39,000 | .00735 | .00055 | ..... | ..... | |
| 40,000 | .00800 | .00065 | ..... | ..... | |
| 85,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 85,600 |
| Elastic limit per square inch of original section | do... | 35,000 |
| Elongation per inch after rupture | inch.. | .1850 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.20*, ″.17 |

## No. 6983.

Marks, $\overset{S\ 47}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 33,000 | .00110 | .00010 | ..... | ..... | Elastic limit. |
| 34,000 | .00135 | .00025 | ..... | ..... | |
| 35,000 | .00550 | .00415 | ..... | ..... | |
| 36,000 | .00650 | .00100 | ..... | ..... | |
| 37,000 | .00700 | .00050 | ..... | ..... | |
| 38,000 | .00800 | .00100 | ..... | ..... | |
| 76,550 | ..... | ..... | ..... | ..... | Tensile strength |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 76,550 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .0700 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .025 |
| Reduction in area after rupture, per cent of original section | | 9.5 |
| Position of rupture | | ″.5 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.06, ″.08* |

## No. 6992.

Marks, $\frac{S\ 47}{2\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 33,000 | .00115 | .00015 | ..... | ..... | Elastic limit. |
| 34,000 | .00135 | .00020 | ..... | ..... | |
| 35,000 | .01150 | .01015 | ..... | ..... | |
| 36,000 | .01190 | .00040 | ..... | ..... | |
| 37,000 | .01250 | .00060 | ..... | ..... | |
| 38,000 | .01350 | .00100 | ..... | ..... | |
| 71,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,000 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .1200 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.11, ″.13* |

## No. 7020.

Marks, $\frac{S\ 47}{3\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0 | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00080 | .00045 | ..... | ..... | |
| 30,000 | .00110 | .00030 | ..... | ..... | |
| 36,000 | .00145 | .00035 | ..... | ..... | Elastic limit. |
| 37,000 | .00800 | .00655 | ..... | ..... | |
| 38,000 | .00975 | .00175 | ..... | ..... | |
| 39,000 | .01010 | .00035 | ..... | ..... | |
| 40,000 | .01115 | .00105 | ..... | ..... | |
| 41,000 | .01200 | .00085 | ..... | ..... | |
| 79,900 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 79,900 |
| Elastic limit per square inch of original section | do... | 36,000 |
| Elongation per inch after rupture | inch.. | .1600 |
| Elongation per inch under strain at elastic limit | do... | .00145 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.60 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.16, ″.16* |

## No. 6984.

Marks, $\overset{S\ 49}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 36,000 | .00120 | .00020 | ..... | ..... | Elastic limit. |
| 37,000 | .00815 | .00695 | ..... | ..... | |
| 38,000 | .00850 | .00035 | ..... | ..... | |
| 39,000 | .00910 | .00060 | ..... | ..... | |
| 40,000 | .00960 | .00050 | ..... | ..... | |
| 41,000 | .01050 | .00090 | ..... | ..... | |
| 78,500 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 78,500 |
| Elastic limit per square inch of original section | do... | 36,000 |
| Elongation per inch after rupture | inch.. | .0900 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .025 |
| Reduction in area after rupture, per cent of original section | | 9.5 |
| Position of rupture | | ″.3 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.10*, ″.08 |

## No. 6994.

Marks, $\frac{S\ 49}{2\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 25,000 | .00090 | .00025 | ..... | ..... | Elastic limit. |
| 26,000 | .00115 | .00025 | ..... | ..... | |
| 27,000 | .00165 | .00050 | ..... | ..... | |
| 28,000 | .00425 | .00260 | ..... | ..... | |
| 29,000 | .00575 | .00150 | ..... | ..... | |
| 30,000 | .00640 | .00065 | ..... | ..... | |
| 69,100 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,100 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .2350 |
| Elongation per inch under strain at elastic limit | do... | .00090 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular, dull silky spot at the circumference |
| Elongation of inch sections | | ″.25*, ″.22 |

## No. 6988.

Marks, $\frac{S\ 53}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00105 | .00040 | ..... | ..... | |
| 36,000 | .00140 | .00035 | ..... | ..... | Elastic limit. |
| 37,000 | .00600 | .00460 | ..... | ..... | |
| 38,000 | .00700 | .00100 | ..... | ..... | |
| 39,000 | .00750 | .00050 | ..... | ..... | |
| 40,000 | .00800 | .00050 | ..... | ..... | |
| 41,000 | .00875 | .00075 | ..... | ..... | |
| 85,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 85,600 |
| Elastic limit per square inch of original section | do... | 36,000 |
| Elongation per inch after rupture | inch.. | .1250 |
| Elongation per inch under strain at elastic limit | do... | .00140 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ″.5 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.11, ″.14* |

## No. 7006.

Marks, $\frac{S\ 53}{2\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 32,000 | .00115 | .00015 | ..... | ..... | Elastic limit. |
| 33,000 | .00875 | .00760 | ..... | ..... | |
| 34,000 | .00965 | .00090 | ..... | ..... | |
| 35,000 | .01065 | .00100 | ..... | ..... | |
| 36,000 | .01150 | .00085 | ..... | ..... | |
| 37,000 | .01205 | .00055 | ..... | ..... | |
| 74,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 74,050 |
| Elastic limit per square inch of original section | do... | 32,000 |
| Elongation per inch after rupture | inch.. | .2100 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular, silky oblique spot near circumference; opened cracks in stem. |
| Elongation of inch sections | | ″ 20* ″ 22* |

## No. 6989.

Marks, $\frac{S\ 55}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| 30,000 | .00105 | .00035 | ..... | ..... | |
| 38,000 | .00135 | .00030 | ..... | ..... | |
| 39,000 | .00140 | .00005 | ..... | ..... | Elastic limit. |
| 40,000 | .00910 | .00770 | ..... | ..... | |
| 41,000 | .00960 | .00050 | ..... | ..... | |
| 42,000 | .01025 | .00065 | ..... | ..... | |
| 43,000 | .01125 | .00100 | ..... | ..... | |
| 44,000 | .01200 | .00075 | ..... | ..... | |
| 75,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 75,100 |
| Elastic limit per square inch of original section | do... | 39,000 |
| Elongation per inch after rupture | inch.. | .0650 |
| Elongation per inch under strain at elastic limit | do... | .00140 |
| Reduction in diameter at point of rupture | do... | .025 |
| Reduction in area after rupture, per cent of original section | | 9.5 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular, dull silky spot at the circumference |
| Elongation of inch sections | | ″.06*, ″.07* |

## No. 7007.

Marks, $\frac{S\ 55}{2\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | Elastic limit. |
| 31,000 | .00940 | .00840 | ..... | ..... | |
| 32,000 | .01015 | .00075 | ..... | ..... | |
| 33,000 | .01130 | .00015 | ..... | ..... | |
| 34,000 | .01240 | .00110 | ..... | ..... | |
| 35,000 | .01350 | .00110 | ..... | ..... | |
| 68,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,000 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .2250 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.20, ″.25* |

## No. 6991.

Marks, $\overset{S\ 56}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 38,000 | .00135 | .00035 | ..... | ..... | Elastic limit. |
| 39,000 | .00785 | .00650 | ..... | ..... | |
| 40,000 | .00835 | .00050 | ..... | ..... | |
| 41,000 | .00915 | .00080 | ..... | ..... | |
| 42,000 | .00975 | .00060 | ..... | ..... | |
| 43,000 | .01060 | .00085 | ..... | ..... | |
| 83,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 83,100 |
| Elastic limit per square inch of original section | do... | 38,000 |
| Elongation per inch after rupture | inch.. | .1500 |
| Elongation per inch under strain at elastic limit | do... | .00135 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.17*, ″.13 |

## No. 6990.

Marks, $\frac{S\ 57}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 36,000 | .00140 | .00040 | ..... | ..... | |
| 37,000 | .00150 | .00010 | ..... | ..... | Elastic limit. |
| 38,000 | .01000 | .00850 | ..... | ..... | |
| 39,000 | .01075 | .00075 | ..... | ..... | |
| 40,000 | .01150 | .00075 | ..... | ..... | |
| 41,000 | .01210 | .00060 | ..... | ..... | |
| 42,000 | .01300 | .00090 | ..... | ..... | |
| 79,000 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 79,000 |
| Elastic limit per square inch of original section | do... | 87,000 |
| Elongation per inch after rupture | inch.. | .1500 |
| Elongation per inch under strain at elastic limit | do... | .00150 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.14*, ″.16* |

## No. 7008.

Marks, $\frac{S\ 62}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | 00060 | .00030 | ..... | ..... | |
| 30,000 | .00095 | .00035 | ..... | ..... | |
| 39,000 | .00135 | .00040 | ..... | ..... | Elastic limit. |
| 40,000 | .00425 | .00290 | ..... | ..... | |
| 41,000 | .00535 | .00110 | ..... | ..... | |
| 42,000 | .00590 | .00055 | ..... | ..... | |
| 43,000 | .00650 | .00060 | ..... | ..... | |
| 44,000 | .00705 | .00055 | ..... | ..... | |
| 96,700 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 96,700 |
| Elastic limit per square inch of original section | do... | 89,000 |
| Elongation per inch after rupture | inch.. | .1500 |
| Elongation per inch under strain at elastic limit | do... | .00135 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.55 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.16*, ″.14 |

## No. 7083.

Marks, $\frac{S\ 62}{2\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 28,000 | .00100 | .00035 | ..... | ..... | |
| 29,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 30,000 | .00225 | .00120 | ..... | ..... | |
| 31,000 | .00350 | .00125 | ..... | ..... | |
| 32,000 | .00400 | .00050 | ..... | ..... | |
| 33,000 | .00500 | .00100 | ..... | ..... | |
| 34,000 | .00600 | .00100 | ..... | ..... | |
| 71,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,100 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1650 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.18*, ″.15 |

## No. 7009.

Marks, $\frac{S\ 63}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 32,000 | .00110 | .00010 | ..... | ..... | Elastic limit. |
| 33,000 | .01200 | .01090 | ..... | ..... | |
| 34,000 | .01245 | .00045 | ..... | ..... | |
| 35,000 | .01340 | .00095 | ..... | ..... | |
| 36,000 | .01450 | .00110 | ..... | ..... | |
| 37,000 | .01600 | .00150 | ..... | ..... | |
| 66,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,500 |
| Elastic limit per square inch of original section | do... | 32,000 |
| Elongation per inch after rupture | inch.. | .2450 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | 1″.06 from neck |
| Character of broken surface | | silky, 50 per cent of surface interspersed with fine granulation |
| Elongation of inch sections | | ″.23, ″.26 |

## No. 7018.

Marks, $\overset{S\ 65}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00080 | .00015 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 30,000 | .00105 | .00040 | ..... | ..... | |
| 31,000 | .00110 | .00005 | ..... | ..... | Elastic limit. |
| 32,000 | .00435 | .00325 | ..... | ..... | |
| 33,000 | .00875 | .00440 | ..... | ..... | |
| 34,000 | .00900 | .00025 | ..... | ..... | |
| 35,000 | .00935 | .00035 | ..... | ..... | |
| 36,000 | .01025 | .00090 | ..... | ..... | |
| 37,000 | .01110 | .00085 | ..... | ..... | |
| 70,000 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,000 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .1000 |
| Elongation per inch under strain at elastic limit | do .. | .00110 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ″.45 from neck |
| Character of broken surface | | granular, dull spot at the circumference |
| Elongation of inch sections | | ″.10, ″.10* |

## No. 7122.

Marks, $\overset{S\ 65}{2\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00015 | .00005 | ..... | ..... | |
| 20,000 | .00035 | .00020 | ..... | ..... | |
| 25,000 | .00060 | .00025 | ..... | ..... | |
| 29,000 | ..... | ..... | ..... | ..... | Elastic limit. |
| 30,000 | .00390 | .00330 | ..... | ..... | |
| 31,000 | .00560 | .00170 | ..... | ..... | |
| 32,000 | .00650 | .00090 | ..... | ..... | |
| 33,000 | .00725 | .00075 | ..... | ..... | |
| 34,000 | .00850 | .00125 | ..... | ..... | |
| 35,000 | .00950 | .00100 | ..... | ..... | |
| 69,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,900 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .2100 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.10 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.22*, ″.20 |

## No. 7021.

Marks, $\frac{S\ 66}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 31,000 | .00110 | .00010 | ..... | ..... | |
| 32,000 | .00120 | .00010 | ..... | ..... | |
| 33,000 | .00125 | .00005 | ..... | ..... | Elastic limit. |
| 34,000 | .00150 | .00025 | ..... | ..... | |
| | .00960 | .00810 | ..... | ..... | |
| 35,000 | .01040 | .00080 | ..... | ..... | |
| 36,000 | .01115 | .00075 | ..... | ..... | |
| 37,000 | .01200 | .00085 | ..... | ..... | |
| 38,000 | .01330 | .00130 | ..... | ..... | |
| 72,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,050 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .1750 |
| Elongation per inch under strain at elastic limit | do... | .00125 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular, silky spot at the circumference; opened cracks in stem |
| Elongation of inch sections | | ″.18*, ″.17 |

## No. 7019.

Marks, $\overset{S\ 67}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 25,000 | .00095 | .00030 | ..... | ..... | |
| 27,000 | .00105 | .00010 | ..... | ..... | |
| 28,000 | .00120 | .00015 | ..... | ..... | Elastic limit. |
| 29,000 | .00145 | .00025 | ..... | ..... | |
| 30,000 | .00250 | .00105 | ..... | ..... | |
| 31,000 | .00450 | .00200 | ..... | ..... | |
| 32,000 | .00650 | .00200 | ..... | ..... | |
| 33,000 | .00800 | .00150 | ..... | ..... | |
| 34,000 | .00900 | .00100 | ..... | ..... | |
| 35,000 | .00990 | .00090 | ..... | ..... | |
| 69,900 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,900 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .1400 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.40 from neck |
| Character of broken surface | | granular, dull spot at the circumference |
| Elongation of inch sections | | ″.13, ″.15* |

## No. 7123.

Marks, $\overset{S\ 67}{2\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00080 | .00015 | ..... | ..... | |
| 20,000 | .00070 | .00040 | ..... | ..... | |
| 25,000 | .00090 | .00020 | ..... | ..... | |
| 28,000 | .00105 | .00015 | ..... | ..... | |
| 29,000 | .00110 | .00005 | ..... | ..... | |
| 30,000 | .00115 | .00005 | ..... | ..... | Elastic limit. |
| 31,000 | .00200 | .00085 | ..... | ..... | |
| 32 000 | .00450 | .00250 | ..... | ..... | |
| 33,000 | .00765 | .00315 | ..... | ..... | |
| 34,000 | .00875 | .00110 | ..... | ..... | |
| 35,000 | .00975 | .00100 | ..... | ..... | |
| 36,000 | .01050 | .00075 | ..... | ..... | |
| 68,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,950 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .1200 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | 1″.05 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.10, ″.14* |

## No. 7194.

Marks, $\frac{S\ 67}{3\ P.\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 22,000 | .00070 | .00010 | ..... | ..... | |
| 23,000 | .00075 | .00005 | ..... | ..... | Elastic limit. |
| 24,000 | .00100 | .00025 | ..... | ..... | |
| 25,000 | .00135 | .00035 | ..... | ..... | |
| 26,000 | .00170 | .00035 | ..... | ..... | |
| 27,000 | .00400 | .00230 | ..... | ..... | |
| 28,000 | .00550 | .00150 | ..... | ..... | |
| 29,000 | .00660 | .00110 | ..... | ..... | |
| 66,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,450 |
| Elastic limit per square inch of original section | do... | 23,000 |
| Elongation per inch after rupture | inch.. | .1750 |
| Elongation per inch under strain at elastic limit | do... | .00075 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.50 from neck |
| Character of broken surface | | granular, silvery luster, silky spot at circumference |
| Elongation of inch sections | | ″.16, ″.19* |

## No. 7022.

Marks, $\frac{S\ 69}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 31,000 | .00110 | .00010 | ..... | ..... | Elastic limit. |
| 32,000 | .00650 | .00540 | ..... | ..... | |
| 33,000 | .00750 | .00100 | ..... | ..... | |
| 34,000 | .00850 | .00100 | ..... | ..... | |
| 35,000 | .00950 | .00100 | ..... | ..... | |
| 36,000 | .01080 | .00080 | ..... | ..... | |
| 71,600 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,600 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .2100 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | granular 60 per cent, dull silky 40 per cent |
| Elongation of inch sections | | ″.24*, ″.18 |

## No. 7023.

Marks, $\frac{S\ 70}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 24,000 | .00085 | .00020 | ..... | ..... | Elastic limit. |
| 25,000 | .00100 | .00015 | ..... | ..... | |
| 26,000 | .00190 | .00090 | ..... | ..... | |
| 27,000 | .00710 | .00520 | ..... | ..... | |
| 28,000 | .00825 | .00115 | ..... | ..... | |
| 29,000 | .00900 | .00075 | ..... | ..... | |
| 30,000 | .01050 | .00150 | ..... | ..... | |
| 61,800 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 61,800 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .1650 |
| Elongation per inch under strain at elastic limit | do... | .00085 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.65 from neck |
| Character of broken surface | | silky, interspersed with granular metal |
| Elongation of inch sections | | ″.19*, ″.14 |

## No. 7084.

Marks, $\overset{S\ 71}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 30,000 | .00095 | .00035 | ..... | ..... | |
| 33,000 | .00110 | .00015 | ..... | ..... | Elastic limit. |
| 34,000 | .00750 | .00640 | ..... | ..... | |
| 35,000 | .00900 | .00150 | ..... | ..... | |
| 36,000 | .00965 | .00065 | ..... | ..... | |
| 37,000 | .01050 | .00085 | ..... | ..... | |
| 38,000 | .01160 | .00110 | ..... | ..... | |
| 73,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 73,400 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .1300 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.5 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.12, ″.14* |

## No. 7168.

Marks, $\frac{S\ 71}{2\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00015 | .00010 | ..... | ..... | |
| 20,000 | .00050 | .00035 | ..... | ..... | |
| 30,000 | .00085 | .00035 | ..... | ..... | |
| 34,000 | .00100 | .00015 | ..... | ..... | |
| 35,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 36,000 | .00900 | .00795 | ..... | ..... | |
| 37,000 | .00950 | .00050 | ..... | ..... | |
| 38,000 | .01025 | .00075 | ..... | ..... | |
| 39,000 | .01100 | .00075 | ..... | ..... | |
| 40,000 | .01250 | .00150 | ..... | ..... | |
| 41,000 | .01300 | .00050 | ..... | ..... | |
| 75,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 75,950 |
| Elastic limit per square inch of original section | do... | 35,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.15 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.19*, ″.19 |

## No. 7077.

Marks, $\frac{S\ 73}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | 0. | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 31,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 32,000 | .00500 | .00395 | ..... | ..... | |
| 33,000 | .00740 | .00240 | ..... | ..... | |
| 34,000 | .00815 | .00075 | ..... | ..... | |
| 35,000 | .00920 | .00105 | ..... | ..... | |
| 36,000 | .01000 | .00080 | ..... | ..... | |
| 71,700 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,700 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .1250 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ″.50 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.11, ″.14* |

## No. 7169.

Marks, $\frac{S\ 73}{2\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00015 | .00010 | ..... | ..... | |
| 20,000 | .00050 | .00035 | ..... | ..... | |
| 25,000 | .00095 | .00045 | ..... | ..... | Elastic limit. |
| 26,000 | .00135 | .00040 | ..... | ..... | |
| 27,000 | .00150 | .00015 | ..... | ..... | |
| 28,000 | .00250 | .00100 | ..... | ..... | |
| 29,000 | .00290 | .00040 | ..... | ..... | |
| 30,000 | .00375 | .00085 | ..... | ..... | |
| 31,000 | .00450 | .00075 | ..... | ..... | |
| 32,000 | .00550 | .00100 | ..... | ..... | |
| 33,000 | .00600 | .00050 | ..... | ..... | |
| 34,000 | .00700 | .00100 | ..... | ..... | |
| 35,000 | .00800 | .00100 | ..... | ..... | |
| 70,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,950 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .2150 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.80 from neck |
| Character of broken surface | | granular 50 per cent, silky 50 per cent |
| Elongation of inch sections | | ″.23*, ″.20 |

## No. 7085.

Marks, $\frac{S\ 74}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 29,000 | .00105 | .00040 | ..... | ..... | Elastic limit. |
| 30,000 | .00800 | .00695 | ..... | ..... | |
| 31,000 | .00875 | .00075 | ..... | ..... | |
| 32,000 | .01000 | .00125 | ..... | ..... | |
| 33,000 | .01080 | .00080 | ..... | ..... | |
| 34,000 | .01165 | .00085 | ..... | ..... | |
| 65,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 65,100 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .0950 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ″.4 from neck |
| Character of broken surface | | granular, silky spot at circumference; opened cracks along the stem |
| Elongation of inch sections | | ″.09, ″.10 |

## No. 7174.

Marks, $\frac{S\ 74}{2\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00020 | .00020 | 0. | ..... | |
| 10,000 | .00050 | .00030 | ..... | ..... | |
| 20,000 | .00095 | .00045 | ..... | ..... | |
| 25,000 | .00125 | .00030 | ..... | ..... | |
| 27,000 | .00135 | .00010 | ..... | ..... | |
| 29,000 | .00145 | .00010 | ..... | ..... | Elastic limit. |
| 30,000 | .00340 | .00195 | ..... | ..... | |
| 31,000 | .00600 | .00260 | ..... | ..... | |
| 32,000 | .00975 | .00375 | ..... | ..... | |
| 33,000 | .01190 | .00215 | ..... | ..... | |
| 34,000 | .01315 | .00125 | ..... | ..... | |
| 35,000 | .01360 | .00045 | ..... | ..... | |
| 67,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 67,000 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .2350 |
| Elongation per inch under strain at elastic limit | do... | .00145 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after fracture, per cent of original section | | 27.4 |
| Position of rupture | | 1″.20 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.21, ″.26* |

## No. 7078.

Marks, $\overset{S\ 75}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 31,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 32,000 | .00600 | .00495 | ..... | ..... | |
| 33,000 | .00665 | .00065 | ..... | ..... | |
| 34,000 | .00750 | .00085 | ..... | ..... | |
| 35,000 | .00625 | .00075 | ..... | ..... | |
| 36,000 | .00925 | .00100 | ..... | ..... | |
| 73,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 73,050 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .1000 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.09,″.11* |

## No. 7165.

Marks, $\overset{S\ 75}{2\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00020 | .00010 | ..... | ..... | |
| 20,000 | .00060 | .00040 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 31,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 32,000 | .00825 | .00720 | ..... | ..... | |
| 33,000 | .00900 | .00075 | ..... | ..... | |
| 34,000 | .01000 | .00100 | ..... | ..... | |
| 35,000 | .01110 | .00110 | ..... | ..... | |
| 36,000 | .01200 | .00090 | ..... | ..... | |
| 37,000 | .01300 | .00100 | ..... | ..... | |
| 69,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,000 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .1600 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular 75 per cent, silky 25 per cent |
| Elongation of inch sections | | ″.15, ″.17* |

## No. 7086.

Marks, $\frac{S\ 76}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 32,000 | .00115 | .00015 | ..... | ..... | Elastic limit. |
| 33,000 | .00715 | .00600 | ..... | ..... | |
| 34,000 | .00825 | .00110 | ..... | ..... | |
| 35,000 | .00875 | .00050 | ..... | ..... | |
| 36,000 | .00975 | .00100 | ..... | ..... | |
| 37,000 | .01080 | .00105 | ..... | ..... | |
| 74,650 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 74,650 |
| Elastic limit per square inch of original section | do... | 32,000 |
| Elongation per inch after rupture | inch.. | .1650 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular 70 per cent, silky 30 per cent |
| Elongation of inch sections | | ″.15, ″.18* |

## No. 7087.

**Marks,** $\overset{S\ 77}{P\ Y\ 15}$
**Diameter, ″.505.**
**Sectional area, .20 square inch.**
**Gauged length, 2″.**

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00055 | .00030 | ..... | ..... | |
| 30,000 | .00090 | .00035 | ..... | ..... | |
| 32,000 | 00105 | .00015 | ..... | ..... | Elastic limit. |
| 33,000 | .00735 | .00630 | ..... | ..... | |
| 34,000 | .00800 | .00065 | ..... | ..... | |
| 35,000 | .00875 | .00075 | ..... | ..... | |
| 36,000 | .00950 | .00075 | ..... | ..... | |
| 37,000 | .01095 | .00145 | ..... | ..... | |
| 72,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,050 |
| Elastic limit per square inch of original section | do... | 32,000 |
| Elongation per inch after rupture | inch.. | .1200 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | silky 60 per cent, granular 40 per cent |
| Elongation of inch sections | | ″.13*, ″.11 |

## No. 7175.

Marks, $\overset{S\ 77}{2\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00040 | .00025 | ..... | ..... | |
| 20,000 | .00070 | .00030 | ..... | ..... | |
| 30,000 | .00110 | .00040 | ..... | ..... | |
| 32,000 | .00120 | .00010 | ..... | ..... | Elastic limit. |
| 33,000 | .00550 | .00430 | ..... | ..... | |
| 34,000 | .00925 | .00375 | ..... | ..... | |
| 35,000 | .01125 | .00200 | ..... | ..... | |
| 36,000 | .01225 | .00100 | ..... | ..... | |
| 37,000 | .01240 | .00015 | ..... | ..... | |
| 38,000 | .01260 | .00020 | ..... | ..... | |
| 72,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,500 |
| Elastic limit per square inch of original section | do... | 32,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.10 from neck |
| Character of broken surface | | granular 85 per cent, silky 15 per cent |
| Elongation of inch sections | | ″.18, ″.18* |

## No. 7176.

Marks, $\frac{S\ 77}{2\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00020 | .00020 | 0. | ..... | |
| 10,000 | .00040 | .00020 | ..... | ..... | |
| 20,000 | .00090 | .00050 | ..... | ..... | |
| 22,000 | .00100 | .00010 | ..... | ..... | |
| 24,000 | .00115 | .00015 | ..... | ..... | Elastic limit. |
| 25,000 | .00140 | .00025 | ..... | ..... | |
| 26,000 | .00195 | .00055 | ..... | ..... | |
| 27,000 | .00540 | .00345 | ..... | ..... | |
| 28,000 | .00710 | .00170 | ..... | ..... | |
| 29,000 | .00835 | .00125 | ..... | ..... | |
| 30,000 | .01025 | .00190 | ..... | ..... | |
| 64,800 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 64,800 |
| Elastic limit per square inch of original section | do.... | 24,000 |
| Elongation per inch after rupture | inch.. | .2500 |
| Elongation per inch under strain at elastic limit | do.... | .00115 |
| Reduction in diameter at point of rupture | do.... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | ″.80 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.20, ″.30* |

## No. 7160.

Marks, $\overset{S\ 78}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00030 | .00015 | ..... | ..... | |
| 20,000 | .00070 | .00040 | ..... | ..... | |
| 25,000 | .00095 | .00025 | ..... | ..... | |
| 27,000 | .00105 | .00010 | ..... | ..... | |
| 28,000 | .00115 | .00010 | ..... | ..... | Elastic limit. |
| 29,000 | .00165 | .00050 | ..... | ..... | |
| 30,000 | .00195 | .00030 | ..... | ..... | |
| 31,000 | .00260 | .00065 | ..... | ..... | |
| 32,000 | .00600 | .00340 | ..... | ..... | |
| 33,000 | .00700 | .00100 | ..... | ..... | |
| 34,000 | .00805 | .00105 | ..... | ..... | |
| 68,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,900 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .1000 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.25 from neck |
| Character of broken surface | | granular 60 per cent, dull silky 40 per cent |
| Elongation of inch sections | | ″.11*, ″.09 |

## No. 7195.

Marks, $\frac{S\ 78}{2\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00065 | .00040 | ..... | ..... | |
| 25,000 | .00085 | .00020 | ..... | ..... | |
| 27,000 | .00095 | .00010 | ..... | ..... | Elastic limit. |
| 28,000 | .00235 | .00140 | ..... | ..... | |
| 29,000 | .00380 | .00145 | ..... | ..... | |
| 30,000 | .00800 | .00420 | ..... | ..... | |
| 31,000 | .00910 | .00110 | ..... | ..... | |
| 32,000 | .00975 | .00065 | ..... | ..... | |
| 33,000 | .01075 | .00100 | ..... | ..... | |
| 66,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,500 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .2350 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ″.90 from neck |
| Character of broken surface | | granular 50 per cent, silky 50 per cent |
| Elongation of inch sections | | ″.19, ″.28* |

## No. 7124.

**Marks,** $\frac{S\ 79}{P\ Y\ 15}$
**Diameter,** ″.505,
**Sectional area,** .20 square inch.
**Gauged length,** 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00030 | .00015 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 30,000 | .00115 | .00050 | ..... | ..... | Elastic limit. |
| | .00500 | .00385 | ..... | ..... | |
| 31,000 | .00700 | .00200 | ..... | ..... | |
| 32,000 | .00810 | .00110 | ..... | ..... | |
| 33,000 | .00935 | .00125 | ..... | ..... | |
| 34,000 | .00975 | .00040 | ..... | ..... | |
| 35,000 | .01075 | .00100 | ..... | ..... | |
| 66,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,500 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .1000 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ″.30 from neck |
| Character of broken surface | | granular, silky spot at the circumference, containing a cavity about ″.10 diameter |
| Elongation of inch sections | | ″.10*, ″.10 |

## No. 7125.

Marks, $\frac{S\ 80}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 29,000 | ..... | ..... | ..... | ..... | Elastic limit, approximate. |
| 40,000 | .01245 | .01245 | ..... | ..... | |
| 41,000 | .01300 | .00055 | ..... | ..... | |
| 42,000 | .01400 | .00100 | ..... | ..... | |
| 43,000 | .01510 | .00110 | ..... | ..... | |
| 44,000 | .01625 | .00115 | ..... | ..... | |
| 45,000 | .01775 | .00150 | ..... | ..... | |
| 66,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,400 |
| Elastic limit per square inch of original section (approximate) | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .0650 |
| Reduction in diameter at point of rupture | do... | .025 |
| Reduction in area after rupture, per cent of original section | | 9.5 |
| Position of rupture | | ″.90 from neck |
| Character of broken surface | | granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.07*, ″.06 |

## No. 7177.

Marks, $\frac{S\ 80}{2\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00000 | .00000 | 0. | ..... | |
| 10,000 | .00010 | .00010 | ..... | ..... | |
| 20,000 | .00040 | .00030 | ..... | ..... | |
| 25,000 | .00055 | .00015 | ..... | ..... | |
| 26,000 | .00065 | .00010 | ..... | ..... | |
| 27,000 | .00075 | .00010 | ..... | ..... | |
| 28,000 | .00090 | .00015 | ..... | ..... | Elastic limit. |
| 29,000 | .00250 | .00160 | ..... | ..... | |
| 30,000 | .00400 | .00150 | ..... | ..... | |
| 31,000 | .00675 | .00275 | ..... | ..... | |
| 32,000 | .00840 | .00165 | ..... | ..... | |
| 33,000 | .00925 | .00085 | ..... | ..... | |
| 34,000 | .01125 | .00200 | ..... | ..... | |
| 70,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,500 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .2100 |
| Elongation per inch under strain at elastic limit | do... | .00090 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | 1″.14 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.22*, ″.20 |

## No. 7161.

Marks, $\overset{S\ 83}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00075 | .00040 | ..... | ..... | |
| 25,000 | .00100 | .00025 | ..... | ..... | |
| 26,000 | .00105 | .00005 | ..... | ..... | |
| 27,000 | .00115 | .00010 | ..... | ..... | Elastic limit. |
| 28,000 | .00150 | .00035 | ..... | ..... | |
| 29,000 | .00250 | .00100 | ..... | ..... | |
| 30,000 | .00560 | .00310 | ..... | ..... | |
| 31,000 | .00670 | .00110 | ..... | ..... | |
| 32,000 | .00800 | .00130 | ..... | ..... | |
| 33,000 | .00850 | .00050 | ..... | ..... | |
| 34,000 | .00950 | .00100 | ..... | ..... | |
| 69,950 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,950 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch... | .1650 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″,17*,″.16 |

## No. 7147.

Marks, $\frac{S\ 84}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00020 | .00010 | ..... | ..... | |
| 20,000 | .00050 | .00030 | ..... | ..... | |
| 25,000 | .00070 | .00020 | ..... | ..... | |
| 27,000 | .00085 | .00015 | ..... | ..... | |
| 28,000 | .00095 | .00010 | ..... | ..... | Elastic limit. |
| 29,000 | .00300 | .00205 | ..... | ..... | |
| 30,000 | .00575 | .00275 | ..... | ..... | |
| 31,000 | .00625 | .00050 | ..... | ..... | |
| 32,000 | .00725 | .00100 | ..... | ..... | |
| 33,000 | .00820 | .00095 | ..... | ..... | |
| 34,000 | .00920 | .00100 | ..... | ..... | |
| 69,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,450 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .1200 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | 1″.05 from neck |
| Character of broken surface | | granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.11, ″.13* |

## No. 7178.

Marks, $\frac{S\ 86}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00020 | .00015 | ..... | ..... | |
| 20,000 | .00045 | .00025 | ..... | ..... | |
| 25,000 | .00065 | .00020 | ..... | ..... | |
| 28,000 | .00085 | .00015 | ..... | ..... | |
| 30,000 | .00090 | .00010 | ..... | ..... | |
| 31,000 | .00095 | .00005 | ..... | ..... | Elastic limit. |
| 32,000 | .00325 | .00230 | ..... | ..... | |
| 33,000 | .00650 | .00325 | ..... | ..... | |
| 34,000 | .00875 | .00225 | ..... | ..... | |
| 35,000 | .01000 | .00125 | ..... | ..... | |
| 36,000 | .01100 | .00100 | ..... | ..... | |
| 70,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,400 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .1200 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 18.2 |
| Position of rupture | | .″98 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.11, ″.13* |

## No. 7196.

Marks, $\frac{S\ 86}{2\ P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00025 | .00010 | ..... | ..... | |
| 20,000 | .00070 | .00045 | ..... | ..... | |
| 22,000 | .00080 | .00010 | ..... | ..... | |
| 24,000 | .00090 | .00010 | ..... | ..... | Elastic limit. |
| 25,000 | .00110 | .00020 | ..... | ..... | |
| 26,000 | .00135 | .00025 | ..... | ..... | |
| 27,000 | .00165 | .00030 | ..... | ..... | |
| 28,000 | .00200 | .00035 | ..... | ..... | |
| 29,000 | .00275 | .00075 | ..... | ..... | |
| 30,000 | .00375 | .00100 | ..... | ..... | |
| 31,000 | .00450 | .00075 | ..... | ..... | |
| 66,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,400 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .1950 |
| Elongation per inch under strain at elastic limit | do... | .00090 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.22*, ″.17 |

## No. 7204.

Marks, $\frac{S\ 88}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00030 | .00015 | ..... | ..... | |
| 20,000 | .00070 | .00040 | ..... | ..... | |
| 25,000 | .00090 | .00020 | ..... | ..... | |
| 28,000 | .00100 | .00010 | ..... | ..... | |
| 29,000 | .00105 | .00005 | ..... | ..... | |
| 30,000 | .00110 | .00005 | ..... | ..... | Elastic limit. |
| 31,000 | .00675 | .00565 | ..... | ..... | |
| 32,000 | .00800 | .00125 | ..... | ..... | |
| 33,000 | .00875 | .00075 | ..... | ..... | |
| 34,000 | .00950 | .00075 | ..... | ..... | |
| 35,000 | .01075 | .00125 | ..... | ..... | |
| 63,900 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 63,900 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .0750 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .025 |
| Reduction in area after rupture, per cent of original section | | 9.5 |
| Position of rupture | | ″.90 from neck |
| Character of broken surface | | granular 85 per cent, silky 15 per cent |
| Elongation of inch sections | | ″.07, ″.06* |

## No. 7197.

Marks, $\frac{S\ 90}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00110 | .00050 | ..... | ..... | |
| 31,000 | .00115 | .00005 | ..... | ..... | Elastic limit. |
| 32,000 | .00300 | .00185 | ..... | ..... | |
| 33,000 | .00765 | .00465 | ..... | ..... | |
| 34,000 | .00820 | .00055 | ..... | ..... | |
| 35,000 | .00940 | .00120 | ..... | ..... | |
| 36,000 | .01015 | .00075 | ..... | ..... | |
| 65,850 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 65,850 |
| Elastic limit per square inch of original section | do... | 81,000 |
| Elongation per inch after rupture | inch.. | .0950 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ″.20 from neck |
| Character of broken surface | | dull silky 90 per cent, granular 10 per cent |
| Elongation of inch sections | | ″.12*, ″.07 |

## No. 7198.

Marks, $\overset{S\ 91}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| 30,000 | .00110 | .00040 | ..... | ..... | |
| 31,000 | .00115 | .00005 | ..... | ..... | Elastic limit. |
| 32,000 | .00850 | .00735 | ..... | ..... | |
| 33,000 | .00915 | .00065 | ..... | ..... | |
| 34,000 | .01000 | .00085 | ..... | ..... | |
| 35,000 | .01100 | .00100 | ..... | ..... | |
| 36,000 | .01175 | .00075 | ..... | ..... | |
| 69,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,500 |
| Elastic limit per square inch of original section | do.... | 31,000 |
| Elongation per inch after rupture | inch.. | .1450 |
| Elongation per inch under strain at elastic limit | do.... | .00115 |
| Reduction in diameter at point of rupture | do.... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.15*, ″.14 |

## No. 7199.

Marks, $\frac{S\ 93}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 28,000 | .00095 | .00035 | ..... | ..... | |
| 29,000 | .00100 | .00005 | ..... | ..... | |
| 30,000 | .00100 | 0. | ..... | ..... | Elastic limit. |
| 31,000 | .00475 | .00375 | ..... | ..... | |
| 32,000 | .00675 | .00200 | ..... | ..... | |
| 33,000 | .00750 | .00075 | ..... | ..... | |
| 34,000 | .00815 | .00065 | ..... | ..... | |
| 35,000 | .00900 | .00085 | ..... | ..... | |
| 72,500 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,500 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .1650 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.50 from neck |
| Character of broken surface | | granular 85 per cent, silky 15 per cent |
| Elongation of inch sections | | ″.17, ″.16*. |

## No. 7200.

Marks, $\frac{S\ 94}{P\ Y\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00030 | .00015 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 30,000 | .00110 | .00045 | ..... | ..... | |
| 31,000 | .00115 | .00005 | ..... | ..... | Elastic limit. |
| 32,000 | .00675 | .00560 | ..... | ..... | |
| 33,000 | .00750 | .00075 | ..... | ..... | |
| 34,000 | .00800 | .00050 | ..... | ..... | |
| 35,000 | .00900 | .00100 | ..... | ..... | |
| 36,000 | .01000 | .00160 | ..... | ..... | |
| 73,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 73,900 |
| Elastic limit per square inch of original section | do.... | 31,000 |
| Elongation per inch after rupture | inch.. | .1500 |
| Elongation per inch under strain at elastic limit | do.... | .00115 |
| Reduction in diameter at point of rupture | do.... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.48 from neck |
| Character of broken surface | | granular 90 per cent, silky 10 per cent |
| Elongation of inch sections | | ″.15*, ″.15 |

# INNER BASES—15-POUNDER GUN MOUNTS.

## STEEL CASTINGS.

## No. 6447.

Marks, $\frac{A\ 26}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 15,000 | .00045 | .00020 | ..... | ..... | |
| 20,000 | .00055 | .00010 | ..... | ..... | |
| 25,000 | .00070 | .00015 | ..... | ..... | |
| 30,000 | .00095 | .00025 | ..... | ..... | |
| 31,000 | .00100 | .00005 | ..... | ..... | |
| 32,000 | .00100 | 0. | ..... | ..... | Elastic limit. |
| 33,000 | .01200 | .01100 | ..... | ..... | |
| 34,000 | .01350 | .00150 | ..... | ..... | |
| 35,000 | .01490 | .00140 | ..... | ..... | |
| 36,000 | .01625 | 00135 | ..... | ..... | |
| 37,000 | .01755 | .00130 | ..... | ..... | |
| 38,000 | .01905 | .00150 | ..... | ..... | |
| 39,000 | .02085 | .00180 | ..... | ..... | |
| 40,000 | .02300 | .00215 | ..... | ..... | |
| 64,050 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 64,050 |
| Elastic limit per square inch of original section | do... | 32,000 |
| Elongation per inch after rupture | inch... | .2900 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | 1″.2 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.25, ″.33* |

## No. 6446.

Marks, $\frac{A\ 27}{I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | ..... | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 15,000 | .00050 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00015 | ..... | ..... | |
| 25,000 | .00085 | .00020 | ..... | ..... | Elastic limit. |
| 26,000 | .00105 | .00020 | ..... | ..... | |
| 27,000 | .00175 | .00070 | ..... | ..... | |
| 28,000 | .00460 | .00285 | ..... | ..... | |
| 30,000 | .00550 | .00090 | ..... | ..... | |
| 31,000 | .00655 | .00105 | ..... | ..... | |
| 32,000 | .00785 | .00130 | ..... | ..... | |
| 33,000 | .00895 | .00110 | ..... | ..... | |
| 34,000 | .01035 | .00140 | ..... | ..... | |
| 35,000 | .01195 | .00160 | ..... | ..... | |
| 51,600 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 51,600 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .0650 |
| Elongation per inch under strain at elastic limit | do... | .00085 |
| Reduction in diameter at point of rupture | do... | .025 |
| Reduction in area after rupture, per cent of original section | | 9.5 |
| Position of rupture | | at the neck |
| Character of broken surface | | granular, spongy spot at the circumference |
| Elongation of inch sections | | ".05, ".08 * |

## No. 6448.

Marks, $\frac{A\ 29}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 15,000 | .00045 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00015 | ..... | ..... | |
| 25,000 | .00085 | .00025 | ..... | ..... | |
| 28,000 | .00100 | .00015 | ..... | ..... | |
| 29,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 30,000 | .00145 | .00040 | ..... | ..... | |
| 31,000 | .00195 | .00050 | ..... | ..... | |
| 32,000 | .00250 | .00055 | ..... | ..... | |
| 33,000 | .00800 | .00550 | ..... | ..... | |
| 34,000 | .01000 | .00200 | ..... | ..... | |
| 35,000 | .01100 | .00100 | ..... | ..... | |
| 36,000 | .01200 | .00100 | ..... | ..... | |
| 37,000 | .01315 | .00115 | ..... | ..... | |
| 38,000 | .01415 | .00100 | ..... | ..... | |
| 39,000 | .01560 | .00145 | ..... | ..... | |
| 40,000 | .01725 | .00165 | ..... | ..... | |
| 67,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 67,050 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .2150 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | 1″.09 from neck |
| Character of broken surface | | dull amorphous |
| Elongation of inch sections | | ″.21, ″.22* |

## No. 6976.

Marks, $\frac{A\ 29}{3\ I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| 27,000 | .00100 | .00030 | ..... | ..... | |
| 28,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 29,000 | .00130 | .00025 | ..... | ..... | |
| 30,000 | .00150 | .00020 | .00055 | .00055 | |
| 31,000 | .00700 | .00550 | ..... | ..... | |
| 32,000 | .00750 | .00050 | ..... | ..... | |
| 33,000 | .00900 | .00150 | ..... | ..... | |
| 74,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 74,100 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .2100 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.17 from neck |
| Character of broken surface | | dull silky 60 per cent, granular 40 per cent |
| Elongation of inch sections | | ″.22*, ″.20 |

## No. 6449.

Marks, $\frac{A\ 80}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00020 | .00015 | ..... | ..... | |
| 15,000 | .00045 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00015 | ..... | ..... | |
| 25,000 | .00075 | .00015 | ..... | ..... | |
| 30,000 | .00100 | .00025 | ..... | ..... | |
| 31,000 | .00105 | .00005 | ..... | ..... | |
| 32,000 | .00110 | .00005 | ..... | ..... | |
| 33,000 | .00115 | .00005 | ..... | ..... | Elastic limit. |
| 34,000 | .01125 | .01010 | ..... | ..... | |
| 35,000 | .01195 | .00070 | ..... | ..... | |
| 36,000 | .01295 | .00100 | ..... | ..... | |
| 37,000 | .01425 | .00130 | ..... | ..... | |
| 38,000 | .01550 | .00125 | ..... | ..... | |
| 39,000 | .01650 | .00100 | ..... | ..... | |
| 40,000 | .01850 | .00200 | ..... | ..... | |
| 41,000 | .01975 | .00125 | ..... | ..... | |
| 42,000 | .02115 | .00140 | ..... | ..... | |
| 43,000 | .02285 | .00170 | ..... | ..... | |
| 66,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,950 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .2350 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.29*, ″.18 |

## No. 6450.

Marks, $\frac{A\ 31}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 15,000 | .00050 | .00020 | ..... | ..... | |
| 18,000 | .00065 | .00015 | ..... | ..... | |
| 20,000 | .00090 | .00025 | ..... | ..... | |
| 21,000 | .00100 | .00010 | ..... | ..... | Elastic limit. |
| 22,000 | .00210 | .00110 | ..... | ..... | |
| 23,000 | .00850 | .00640 | ..... | ..... | |
| 24,000 | .00935 | .00085 | ..... | ..... | |
| 25,000 | .01050 | .00115 | ..... | ..... | |
| 26,000 | .01225 | .00175 | ..... | ..... | |
| 27,000 | .01360 | .00135 | ..... | ..... | |
| 28,000 | .01550 | .00190 | ..... | ..... | |
| 29,000 | .01740 | .00190 | ..... | ..... | |
| 30,000 | .01975 | .00235 | ..... | ..... | |
| 31,000 | .02100 | .00125 | ..... | ..... | |
| 52,850 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 52,850 |
| Elastic limit per square inch of original section | do... | 21,000 |
| Elongation per inch after rupture | inch.. | .3550 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .185 |
| Reduction in area after rupture, per cent of original section | | 59.8 |
| Position of rupture | | 1″.25 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.45*, ″.26 |

## No. 6475.

Marks, $\overset{\text{A 31}}{\text{2 I B 15}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 15,000 | .00050 | .00015 | ..... | ..... | |
| 20,000 | .00065 | .00015 | ..... | ..... | |
| 22,000 | .00080 | .00015 | ..... | ..... | |
| 23,000 | .00090 | .00010 | ..... | ..... | |
| 24,000 | .00095 | .00005 | ..... | ..... | Elastic limit. |
| 25,000 | .01200 | .00105 | ..... | ..... | |
| 26,000 | .01300 | .00100 | ..... | ..... | |
| 27,000 | .01500 | .00200 | ..... | ..... | |
| 28,000 | .01625 | .00125 | ..... | ..... | |
| 29,000 | .01850 | .00225 | ..... | ..... | |
| 30,000 | .02025 | .00175 | ..... | ..... | |
| 31,000 | .02250 | .00225 | ..... | ..... | |
| 32,000 | .02450 | .00200 | ..... | ..... | |
| 33,000 | .02700 | .00250 | ..... | ..... | |
| 52,450 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 52,450 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .3750 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .205 |
| Reduction in area after rupture, per cent of original section | | 64.6 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.52*, ″.23 |

## No. 6517.

Marks, $\overset{A\ 31}{3\ I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.
Bruised specimen.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 15,000 | .00055 | .00020 | ..... | ..... | |
| 18,000 | .00065 | .00010 | ..... | ..... | |
| 19,000 | .00070 | .00005 | ..... | ..... | Elastic limit. |
| 20,000 | .00090 | .00020 | .00035 | .00035 | |
| 21,000 | .00135 | .00045 | ..... | ..... | |
| 22,000 | .00200 | .00065 | ..... | ..... | |
| 23,000 | .00275 | .00075 | ..... | ..... | |
| 24,000 | .00400 | .00125 | ..... | ..... | |
| 25,000 | .00500 | .00100 | ..... | ..... | |
| 26,000 | .01450 | .00950 | ..... | ..... | |
| 27,000 | .01650 | .00200 | ..... | ..... | |
| 28,000 | .01875 | .00225 | ..... | ..... | |
| 48,550 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 48,550 |
| Elastic limit per square inch of original section | do... | 19,000 |
| Elongation per inch after rupture | inch.. | .1850 |
| Elongation per inch under strain at elastic limit | do... | .00070 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 34.0 |
| Position of rupture | | ″.70 from neck |
| Character of broken surface | | dull amorphous, spongy |
| Elongation of inch sections | | ″.13, ″.24* |

## No. 6476.

Marks, $\frac{A\ 32}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00020 | .00015 | ..... | ..... | |
| 15,000 | .00045 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00020 | ..... | ..... | |
| 21,000 | .00075 | .00010 | ..... | ..... | |
| 22,000 | .00095 | .00020 | ..... | ..... | |
| 23,000 | .00105 | .00010 | ..... | ..... | Elastic limit. |
| 24,000 | .00200 | .00095 | ..... | ..... | |
| 25,000 | .00250 | .00050 | ..... | ..... | |
| 26,000 | .00350 | .00100 | ..... | ..... | |
| 27,000 | .00430 | .00080 | ..... | ..... | |
| 28,000 | .00520 | .00090 | ..... | ..... | |
| 29,000 | .00600 | .00080 | ..... | ..... | |
| 30,000 | .00675 | .00075 | ..... | ..... | |
| 31,000 | .00805 | .00130 | ..... | ..... | |
| 32,000 | .00910 | .00105 | ..... | ..... | |
| 33,000 | .01050 | .00140 | ..... | ..... | |
| 63,900 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 63,900 |
| Elastic limit per square inch of original section | do... | 23,000 |
| Elongation per inch after rupture | inch.. | .2350 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 34.0 |
| Position of rupture | | 1″.25 from neck |
| Character of broken surface | | granular 70 per cent, silky 30 per cent |
| Elongation of inch sections | | ″.20, ″.27* |

## No. 6477.

Marks, $\frac{A\ 33}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 15,000 | .00045 | .00020 | ..... | ..... | |
| 20,000 | .00070 | .00025 | ..... | ..... | |
| 21,000 | .00085 | .00015 | ..... | ..... | |
| 22,000 | .00110 | .00025 | ..... | ..... | Elastic limit. |
| 23,000 | .00190 | .00080 | ..... | ..... | |
| 24,000 | .00260 | .00070 | ..... | ..... | |
| 25,000 | .00335 | .00075 | ..... | ..... | |
| 26,000 | .00420 | .00085 | ..... | ..... | |
| 27,000 | .00500 | .00080 | ..... | ..... | |
| 28,000 | .00620 | .00120 | ..... | ..... | |
| 29,000 | .00700 | .00080 | ..... | ..... | |
| 30,000 | .00805 | .00105 | ..... | ..... | |
| 31,000 | .00900 | .00095 | ..... | ..... | |
| 62,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 62,450 |
| Elastic limit per square inch of original section | do... | 22,000 |
| Elongation per inch after rupture | inch.. | .2300 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 34.0 |
| Position of rupture | | ″.50 from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.18, ″.28* |

## No. 6478.

Marks, $\frac{A\ 34}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 15,000 | .00055 | .00025 | ..... | ..... | |
| 20,000 | .00085 | .00030 | ..... | ..... | |
| 21,000 | .00095 | .00010 | ..... | ..... | |
| 22,000 | .00105 | .00010 | ..... | ..... | Elastic limit. |
| 23,000 | .00155 | .00050 | ..... | ..... | |
| 24,000 | .00180 | .00025 | ..... | ..... | |
| 25,000 | .00275 | .00095 | ..... | ..... | |
| 26,000 | .00390 | .00115 | ..... | ..... | |
| 27,000 | .00475 | .00085 | ..... | ..... | |
| 28,000 | .00560 | .00085 | ..... | ..... | |
| 29,000 | .00650 | .00090 | ..... | ..... | |
| 30,000 | .00750 | .00100 | ..... | ..... | |
| 31,000 | .00875 | .00125 | ..... | ..... | |
| 32,000 | .01000 | .00125 | ..... | ..... | |
| 62,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 62,950 |
| Elastic limit per square inch of original section | do... | 22,000 |
| Elongation per inch after rupture | inch.. | .2450 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ″.50 from neck |
| Character of broken surface | | granular, dull spot at circumference |
| Elongation of inch sections | | ″.21, ″.28* |

## No. 6479.

Marks, $\frac{A\ 35}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 15,000 | .00050 | .00020 | ..... | ..... | |
| 20,000 | .00075 | .00025 | ..... | ..... | |
| 21,000 | .00090 | .00015 | ..... | ..... | |
| 22,000 | .00100 | .00010 | ..... | ..... | Elastic limit. |
| 23,000 | .00155 | .00055 | ..... | ..... | |
| 24,000 | .00215 | .00060 | ..... | ..... | |
| 25,000 | .00305 | .00090 | ..... | ..... | |
| 26,000 | .00360 | .00055 | ..... | ..... | |
| 27,000 | .00450 | .00090 | ..... | ..... | |
| 28,000 | .00550 | .00100 | ..... | ..... | |
| 29,000 | .00625 | .00075 | ..... | ..... | |
| 30,000 | .00750 | .00125 | ..... | ..... | |
| 31,000 | .00875 | .00125 | ..... | ..... | |
| 32,000 | .00950 | .00075 | ..... | ..... | |
| 64,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 64,450 |
| Elastic limit per square inch of original section | do... | 22,000 |
| Elongation per inch after rupture | inch.. | .2100 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | ″.55 from neck |
| Character of broken surface | | granular 90 per cent, silky 10 per cent |
| Elongation of inch sections | | ″.22*, ″.20 |

## No. 6737.

Marks, $\frac{A\ 86}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00020 | .00015 | ..... | ..... | |
| 20,000 | .00055 | .00035 | ..... | ..... | |
| 30,000 | .00100 | .00045 | ..... | ..... | Elastic limit. |
| | .00635 | .00535 | ..... | ..... | |
| 31,000 | .00710 | .00075 | ..... | ..... | |
| 32,000 | .00765 | .00055 | ..... | ..... | |
| 33,000 | .00870 | .00105 | ..... | ..... | |
| 34,000 | .00955 | .00085 | ..... | ..... | |
| 35,000 | .01100 | .00145 | ..... | ..... | |
| 70,500 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,500 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .2200 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular, dull silky spot at the circumference |
| Elongation of inch sections | | ″.25*, ″.19 |

## No. 6738.

Marks, $\frac{A\ 37}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00030 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 25,000 | .00095 | .00035 | ..... | ..... | Elastic limit. |
| 26,000 | .00140 | .00045 | ..... | ..... | |
| 27,000 | .00410 | .00270 | ..... | ..... | |
| 28,000 | .01010 | .00600 | ..... | ..... | |
| 29,000 | .01050 | .00040 | ..... | ..... | |
| 30,000 | .01150 | .00100 | ..... | ..... | |
| 62,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 62,600 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .2900 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .105 |
| Reduction in area after rupture, per cent of original section | | 87.1 |
| Position of rupture | | 1″.2 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.26, ″.82* |

## No. 6739.

Marks, $\frac{A\ 38}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00025 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 30,000 | .00110 | .00050 | ..... | ..... | Elastic limit. |
| 31,000 | .00595 | .00485 | ..... | ..... | |
| 32,000 | .00975 | .00380 | ..... | ..... | |
| 33,000 | .01050 | .00075 | ..... | ..... | |
| 34,000 | .01105 | .00055 | ..... | ..... | |
| 35,000 | .01205 | .00100 | ..... | ..... | |
| 67,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 67,500 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .2500 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | silky, trace of granulation |
| Elongation of inch sections | | ″.23, ″.27* |

## No. 6740.

Marks, $\frac{A\ 39}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00035 | .00030 | ..... | ..... | |
| 18,000 | .00055 | .00020 | ..... | ..... | |
| 19,000 | .00065 | .00010 | ..... | ..... | Elastic limit. |
| 20,000 | .00150 | .00085 | ..... | ..... | |
| 21,000 | .00240 | .00090 | ..... | ..... | |
| 22,000 | .00360 | .00120 | ..... | ..... | |
| 23,000 | .00450 | .00090 | ..... | ..... | |
| 24,000 | .00575 | .00125 | ..... | ..... | |
| 57,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of origiual section | pounds.. | 57,500 |
| Elastic limit per square inch of original section | do... | 19,000 |
| Elongation per inch after rupture | inch.. | .2650 |
| Elongation per inch under strain at elastic limit | do... | .00065 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | ″.55 from neck |
| Character of broken surface | | granular 60 per cent, dull amorphous 40 per cent |
| Elongation of inch sections | | ″.31 *, ″.22 |

## No. 6922.

Marks, $\frac{A\ 39}{2\ I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 40,000 | .00140 | .00040 | ..... | ..... | |
| 46,000 | .00175 | .00035 | ..... | ..... | |
| 47,000 | .00180 | .00005 | ..... | ..... | Elastic limit. |
| | .02335 | .02155 | ..... | ..... | |
| 48,000 | .02425 | .00090 | ..... | ..... | |
| 49,000 | .02575 | .00150 | ..... | ..... | |
| 50,000 | .02765 | .00190 | ..... | ..... | |
| 51,000 | .03050 | .00285 | ..... | ..... | |
| 52,000 | .03165 | .00115 | ..... | ..... | |
| 70,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,500 |
| Elastic limit per square inch of original section | do... | 47,000 |
| Elongation per inch after rupture | inch.. | .1600 |
| Elongation per inch under strain at elastic limit | do... | .00180 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | dull gray, amorphous |
| Elongation of inch sections | | ″.17*, ″.15* |

## No. 6802.

Marks, $\frac{A\ 40}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 24,000 | .00090 | .00025 | ..... | ..... | Elastic limit. |
| 25,000 | .00125 | .00035 | ..... | ..... | |
| 26,000 | .00200 | .00075 | ..... | ..... | |
| 27,000 | .00400 | .00200 | ..... | ..... | |
| 28,000 | .00535 | .00135 | ..... | ..... | |
| 29,000 | .00665 | .00130 | ..... | ..... | |
| 64,350 | ..... | ..... | ..... | ..... | Tensile strength. |

*Geeneral summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 64,350 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch... | .2050 |
| Elongation per inch under strain at elastic limit | do... | .00090 |
| Reduction in diameter at point of rupture | do... | .665 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | ″.3 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ″.18, ″.23* |

## No. 6849.

Marks, $\frac{A\ 41}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| 28,000 | .00100 | .00030 | ..... | ..... | |
| 29,000 | .00100 | 0. | ..... | ..... | Elastic limit. |
| 30,000 | .00140 | .00040 | ..... | ..... | |
| 31,000 | .00205 | .00065 | ..... | ..... | |
| 32,000 | .00750 | .00545 | ..... | ..... | |
| 33,000 | .00825 | .00075 | ..... | ..... | |
| 34,000 | .00900 | .00075 | ..... | ..... | |
| 69,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,050 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.80 from neck |
| Character of broken surface | | granular 55 per cent, dull silky 45 per cent |
| Elongation of inch sections | | ″.16, ″.20* |

## No. 6741.

Marks, $\frac{A\ 42}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | ..... | ..... | |
| 10,000 | .00030 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 22,000 | .00065 | .00005 | ..... | ..... | Elastic limit. |
| 23,000 | .00085 | .00020 | ..... | ..... | |
| 24,000 | .00100 | .00015 | ..... | ..... | |
| 25,000 | .00125 | .00025 | ..... | ..... | |
| 26,000 | .00155 | .00030 | ..... | ..... | |
| 27,000 | .00205 | .00050 | ..... | ..... | |
| 28,000 | .00300 | .00095 | ..... | ..... | |
| 66,200 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,200 |
| Elastic limit per square inch of original section | do... | 22,000 |
| Elongation per inch after rupture | inch.. | .2050 |
| Elongation per inch under strain at elastic limit | do... | .00065 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | granular 50 per cent, dull amorphous 50 per cent |
| Elongation of inch sections | | ″.17, ″.27* |

## No. 6637.

Marks, $\frac{A\ 43}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 15,000 | .00050 | .00020 | ..... | ..... | |
| 20,000 | .00070 | .00020 | ..... | ..... | |
| 23,000 | .00075 | .00005 | ..... | ..... | |
| 24,000 | .00080 | .00005 | ..... | ..... | Elastic limit. |
| 25,000 | .00100 | .00020 | ..... | ..... | |
| 26,000 | .00115 | .00015 | ..... | ..... | |
| 27,000 | .00145 | .00030 | ..... | ..... | |
| 28,000 | .00195 | .00050 | ..... | ..... | |
| 29,000 | .00235 | .00040 | ..... | ..... | |
| 30,000 | .00310 | .00075 | ..... | ..... | |
| 68,700 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,700 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00080 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | granular 60 per cent, dull amorphous 40 per cent |
| Elongation of inch sections | | ″.19*, ″.17 |

## No. 6717.

Marks, $\frac{A\ 43}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00040 | .00030 | ..... | ..... | |
| 20,000 | .00060 | .00020 | ..... | ..... | |
| 25,000 | .00075 | .00015 | ..... | ..... | |
| 26,000 | .00085 | .00010 | ..... | ..... | |
| 27,000 | .00090 | .00005 | ..... | ..... | Elastic limit. |
| 28,000 | .00150 | .00060 | ..... | ..... | |
| 29,000 | .00325 | .00175 | ..... | ..... | |
| 30,000 | .00415 | .00090 | ..... | ..... | |
| 31,000 | .00460 | .00045 | ..... | ..... | |
| 32,000 | .00550 | .00090 | ..... | ..... | |
| 67,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 67,900 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .1650 |
| Elongation per inch under strain at elastic limit | do.. | .00090 |
| Reduction in diameter at point of rupture | do.. | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular 60 per cent, dull silky 40 per cent |
| Elongation of inch sections | | ″.18*, ″.15* |

## No. 6638.

Marks, $\frac{A\ 44}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 15,000 | .00040 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00020 | ..... | ..... | |
| 25,000 | .00075 | .00015 | ..... | ..... | |
| 28,000 | .00095 | .00020 | ..... | ..... | Elastic limit. |
| 29,000 | .00125 | .00030 | ..... | ..... | |
| 30,000 | .00200 | .00075 | ..... | ..... | |
| 31,000 | .00255 | .00055 | ..... | ..... | |
| 32,000 | .00845 | .00090 | ..... | ..... | |
| 33,000 | .00450 | .00105 | ..... | ..... | |
| 72,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,600 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .1850 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | granular 80 per cent, dull amorphous 20 per cent |
| Elongation of inch sections | | ″.22*, ″.15 |

## No. 6639.

Marks, $\frac{A\ 45}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 15,000 | .00050 | .00020 | ..... | ..... | |
| 20,000 | .00070 | .00020 | ..... | ..... | |
| 25,000 | .00090 | .00020 | ..... | ..... | |
| 30,000 | .00110 | .00020 | ..... | ..... | Elastic limit. |
| 31,000 | .00120 | .00010 | ..... | ..... | |
| 32,000 | .00140 | .00020 | ..... | ..... | |
| 33,000 | .01100 | .00960 | ..... | ..... | |
| 34,000 | .01225 | .00125 | ..... | ..... | |
| 35,000 | .01300 | .00075 | ..... | ..... | |
| 66,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,000 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .1500 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.35 from neck |
| Character of broken surface | | dull amorphous, trace of granulation |
| Elongation of inch sections | | ″.17*, ″.13 |

## No. 6718.

Marks, $\frac{A\ 45}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | ..... | ..... | |
| 10,000 | .00025 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 30,000 | .00090 | .00030 | ..... | ..... | |
| 32,000 | .00100 | .00010 | ..... | ..... | |
| 33,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 34,000 | .01200 | .01095 | ..... | ..... | |
| 35,000 | .01350 | .00150 | ..... | ..... | |
| 36,000 | .01550 | .00200 | ..... | ..... | |
| 37,000 | .01625 | .00075 | ..... | ..... | |
| 38,000 | .01810 | .00185 | ..... | ..... | |
| 65,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 65,600 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .1533 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | dull amorphous |
| Elongation of inch sections | | ″.20, ″.26* |

## No. 6780.

Marks, $\frac{A\ 46}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00055 | .00025 | ..... | ..... | |
| 30,000 | .00100 | .00045 | ..... | ..... | |
| 32,000 | .00115 | .00015 | ..... | ..... | |
| 33,000 | .00120 | .00005 | ..... | ..... | Elastic limit. |
| 34,000 | .00250 | .00130 | ..... | ..... | |
| 35,000 | .01600 | .01350 | ..... | ..... | |
| 36,000 | .01650 | .00050 | ..... | ..... | |
| 37,000 | .01710 | .00060 | ..... | ..... | |
| 38,000 | .01975 | .00265 | ..... | ..... | |
| 65,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 65,600 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .2800 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ″.35 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.25*, ″.21 |

## No. 6742.

Marks, $\frac{A\ 47}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2.″

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00035 | .00030 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 25,000 | .00090 | .00025 | ..... | ..... | Elastic limit. |
| 26,000 | .00105 | .00015 | ..... | ..... | |
| | .01810 | .01705 | ..... | ..... | |
| 27,000 | .02090 | .00280 | ..... | ..... | |
| 28,000 | .02250 | .00160 | ..... | ..... | |
| 29,000 | .02450 | .00200 | ..... | ..... | |
| 30,000 | .02750 | .00300 | ..... | ..... | |
| 50,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 50,100 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .3950 |
| Elongation per inch under strain at elastic limit | do... | .00090 |
| Reduction in diameter at point of rupture | do... | .215 |
| Reduction in area after rupture, per cent of original section | | 66.9 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | silky, cup shaped |
| Elongation of inch sections | | ″.28, ″.51* |

## No. 6766.

Marks, $\overset{A\ 47}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | ..... | ..... | |
| 10,000 | .00040 | .00030 | ..... | ..... | |
| 20,000 | .00085 | .00045 | .00005 | .00005 | |
| 25,000 | .00100 | .00015 | ..... | ..... | Elastic limit. |
| 26,000 | .01800 | .01700 | ..... | ..... | |
| 27,000 | .02050 | .00250 | ..... | ..... | |
| 28,000 | .02250 | .00200 | ..... | ..... | |
| 29,000 | .02550 | .00300 | ..... | ..... | |
| 30,000 | .02925 | .00375 | ..... | ..... | |
| 49,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 49,100 |
| Elastic limit per square inch of original section | do... | 25,000 |
| Elongation per inch after rupture | inch.. | .4100 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .225 |
| Reduction in area after rupture, per cent of original section | | 69.2 |
| Position of rupture | | 1″.2 from neck |
| Character of broken surface | | silky, cup shaped |
| Elongation of inch sections | | ″.52*, ″.30 |

## No. 6980.

Marks, $\frac{A\ 47}{2\ I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 28,000 | .00100 | .00040 | ..... | ..... | Elastic limit. |
| 29,000 | .00500 | .00400 | ..... | ..... | |
| 30,000 | .00625 | .00125 | ..... | ..... | |
| 31,000 | .00725 | .00100 | ..... | ..... | |
| 32,000 | .00810 | .00085 | ..... | ..... | |
| 33,000 | .00900 | .00090 | ..... | ..... | |
| 70,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,050 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .2300 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | 1″.14 from neck. |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.25*, ″.21 |

## No. 6803.

Marks, $\frac{A\ 48}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 28,000 | .00095 | .00035 | ..... | ..... | |
| 29,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 30,000 | .00145 | .00045 | ..... | ..... | |
| 31,000 | .00175 | .00030 | ..... | ..... | |
| 32,000 | .00290 | .00115 | ..... | ..... | |
| 33,000 | .00325 | .00035 | ..... | ..... | |
| 34,000 | .00400 | .00075 | ..... | ..... | |
| 79,150 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 79,150 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 28.9 |
| Position of rupture | | ″.8 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ″.17, ″.21* |

No. 6823.

Marks, $\frac{A\ 49}{I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 51,500 |
| Elastic limit per square inch of original section | do.... | 19,000 |
| Elongation per inch after rupture | inch.. | .3000 |
| Elongation per inch under strain at elastic limit | do.... | .00075 |
| Reduction in diameter at point of rupture | do.... | .185 |
| Reduction in area after rupture, per cent of original section | | 59.5 |
| Position of rupture | | ".90 from neck |
| Character of broken surface | | dull silky |
| Elongation of inch sections | | ".25, ".49 |

## No. 6981.

Marks, $\frac{A\ 49}{2\ I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | Elastic limit. |
| 21,000 | .00100 | .00035 | ..... | ..... | |
| 22,000 | .00130 | .00030 | ..... | ..... | |
| 23,000 | .00195 | .00065 | ..... | ..... | |
| 24,000 | .00240 | .00045 | ..... | ..... | |
| 25,000 | .00300 | .00060 | ..... | ..... | |
| 26,000 | .00405 | .00105 | ..... | ..... | |
| 27,000 | .00465 | .00060 | ..... | ..... | |
| 28,000 | .00595 | .00130 | ..... | ..... | |
| 60,800 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 60,800 |
| Elastic limit per square inch of original section | do... | 20,000 |
| Elongation per inch after rupture | inch.. | .2300 |
| Elongation per inch under strain at elastic limit | do... | .00065 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 80.7 |
| Position of rupture | | ".85 from neck |
| Character of broken surface | | dull amorphous, trace of granulation |
| Elongation of inch sections | | ".18, ".28* |

## No. 7088.

Marks, $\frac{A\ 49}{3\ I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00055 | .00030 | ..... | ..... | |
| 30,000 | .00095 | .00040 | ..... | ..... | |
| 37,000 | .00130 | .00035 | ..... | ..... | |
| 38,000 | .00135 | .00005 | ..... | ..... | Elastic limit. |
| 39,000 | .00800 | .00665 | ..... | ..... | |
| 40,000 | .00900 | .00100 | ..... | ..... | |
| 41,000 | .00980 | .00080 | ..... | ..... | |
| 42,000 | .01000 | .00070 | ..... | ..... | |
| 43,000 | .01060 | .00060 | ..... | ..... | |
| 84,000 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 84,000 |
| Elastic limit per square inch of original section | do... | 38,000 |
| Elongation per inch after rupture | inch.. | .1600 |
| Elongation per inch under strain at elastic limit | do... | .00135 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.14, ″.18* |

## No. 6824.

Marks, $\frac{A\ 50}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 15,000 | .00055 | .00030 | ..... | ..... | Elastic limit. |
| 16,000 | .00115 | .00060 | ..... | ..... | |
| 17,000 | .00150 | .00035 | ..... | ..... | |
| 18,000 | .00250 | .00100 | ..... | ..... | |
| 19,000 | .00455 | .00205 | ..... | ..... | |
| 20,000 | .00610 | .00155 | ..... | ..... | |
| 21,000 | .00760 | .00150 | ..... | ..... | |
| 22,000 | .00950 | .00190 | ..... | ..... | |
| 23,000 | .01060 | .00110 | ..... | ..... | |
| 24,000 | .01200 | .00140 | ..... | ..... | |
| 25,000 | .01400 | .00200 | ..... | ..... | |
| 51,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 51,550 |
| Elastic limit per square inch of original section | do... | 15,000 |
| Elongation per inch after rupture | inch.. | .3650 |
| Elongation per inch under strain at elastic limit | do... | .00065 |
| Reduction in diameter at point of rupture | do... | .165 |
| Reduction in area after rupture, per cent of original section | | 54.6 |
| Position of rupture | | 1″.18 from neck |
| Character of broken surface | | silky, trace of granulation |
| Elongation of inch sections | | ″.43*, ″.30 |

## No. 7004.

Marks, $\frac{A\ 50}{2\ I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | .0 | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 33,000 | .00115 | .00015 | ..... | ..... | Elastic limit. |
| 34,000 | .00145 | .00030 | ..... | ..... | |
| 35,000 | .00640 | .00495 | ..... | ..... | |
| 36,000 | .00700 | .00060 | ..... | ..... | |
| 37,000 | .00765 | .00065 | ..... | ..... | |
| 38,000 | .00850 | .00085 | ..... | ..... | |
| 83,450 | ..... | ..... | ..... | ..... | Tenstile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 83,450 |
| Elastic limit per square inch of original section | do... | 83,000 |
| Elongation per inch after rupture | inch.. | .2050 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.7 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.23*,″,18 |

## No. 6825.

Marks, $\frac{A\ 51}{I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 32,000 | .00110 | .00010 | ..... | ..... | |
| 33,000 | .00115 | .00005 | ..... | ..... | |
| 34,000 | .00120 | .00005 | ..... | ..... | Elastic limit. |
| 35,000 | .00990 | .00870 | ..... | ..... | |
| 36,000 | .01080 | .00090 | ..... | ..... | |
| 37,000 | .01125 | .00045 | ..... | ..... | |
| 38,000 | .01230 | .00105 | ..... | ..... | |
| 39,000 | .01300 | .00070 | ..... | ..... | |
| 40,000 | .01435 | .00135 | ..... | ..... | |
| 73,950 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 73,950 |
| Elastic limit per square inch of original section | do... | 34,000 |
| Elongation per inch after rupture | inch.. | .2250 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | 1".05 from neck |
| Character of broken surface | | granular, dull silky spot at the circumference |
| Elongation of inch sections | | ".28, ".22* |

## No. 6826.

Marks, $\frac{A\ 52}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00080 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 25,000 | .00090 | .00025 | ..... | ..... | |
| 26,000 | .00095 | .00005 | ..... | ..... | Elastic limit. |
| 27,000 | .00850 | .00255 | ..... | ..... | |
| 28,000 | .00675 | .00825 | ..... | ..... | |
| 29,000 | .00750 | .00075 | ..... | ..... | |
| 30,000 | .00825 | .00075 | ..... | ..... | |
| 31,000 | .00925 | .00100 | ..... | ..... | |
| 32,000 | .01025 | .00100 | ..... | ..... | |
| 33,000 | .01110 | .00085 | ..... | ..... | |
| 34,000 | .01200 | .00090 | ..... | ..... | |
| 35,000 | .01310 | .00110 | ..... | ..... | |
| 68,500 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,500 |
| Elastic limit per square inch of original section | do... | 26,000 |
| Elongation per inch after rupture | inch.. | .2250 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.23 from neck |
| Character of broken surface | | granular, dull silky spot at the circumference |
| Elongation of inch sections | | ″.20, ″.25* |

## No. 6827.

Marks, $\frac{A\ 53}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 31,000 | .00110 | .00010 | ..... | ..... | |
| 32,000 | .00115 | .00005 | ..... | ..... | Elastic limit. |
| 33,000 | .01110 | .00995 | ..... | ..... | |
| 34,000 | .01175 | .00065 | ..... | ..... | |
| 35,000 | .01225 | .00050 | ..... | ..... | |
| 36,000 | .01325 | .00100 | ..... | ..... | |
| 37,000 | .01425 | .00100 | ..... | ..... | |
| 38,000 | .01575 | .00150 | ..... | ..... | |
| 39,000 | .01700 | .00125 | ..... | ..... | |
| 40,000 | .01800 | .00100 | ..... | ..... | |
| 69,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,050 |
| Elastic limit per square inch of original section | do... | 32,000 |
| Elongation per inch after rupture | inch.. | .3000 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .115 |
| Reduction in area after rupture, per cent of original section | | 40.3 |
| Position of rupture | | 1″.05 from neck |
| Character of broken surface | | silky, trace of granulation |
| Elongation of inch sections | | ″.26, ″.34* |

## No. 6828.

Marks, $\frac{A\ 54}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00025 | .00010 | ..... | ..... | |
| 15,000 | .00045 | .00020 | ..... | ..... | |
| 16,000 | .00050 | .00005 | ..... | ..... | |
| 17,000 | .00060 | .00010 | ..... | ..... | Elastic limit. |
| 18,000 | .00165 | .00105 | ..... | ..... | |
| 19,000 | .00260 | .00095 | ..... | ..... | |
| 20,000 | .00390 | .00130 | ..... | ..... | |
| 21,000 | .00500 | .00110 | ..... | ..... | |
| 22,000 | .00645 | .00145 | ..... | ..... | |
| 23,000 | .00750 | .00105 | ..... | ..... | |
| 24,000 | .00900 | .00150 | ..... | ..... | |
| 25,000 | .01025 | .00125 | ..... | ..... | |
| 54,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 54,600 |
| Elastic limit per square inch of original section | do... | 17,000 |
| Elongation per inch after rupture | inch.. | .3400 |
| Elongation per inch under strain at elastic limit | do... | .00060 |
| Reduction in diameter at point of rupture | do... | .145 |
| Reduction in area after rupture, per cent of original section | | 49.1 |
| Position of rupture | | 1″.18 from neck |
| Character of broken surface | | silky, trace of granulation |
| Elongation of inch sections | | ″.39*, ″.29 |

## No. 6982.

Marks, $\frac{A\ 54}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 29,000 | .00095 | .00035 | ..... | ..... | Elastic limit. |
| 30,000 | .00115 | .00020 | ..... | ..... | |
| 31,000 | .00790 | .00675 | ..... | ..... | |
| 32,000 | .00830 | .00040 | ..... | ..... | |
| 33,000 | .00915 | .00085 | ..... | ..... | |
| 34,000 | .00990 | .00075 | ..... | ..... | |
| 69,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,050 |
| Elastic limit per square inch of original section | do.... | 29,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do.... | .00095 |
| Reduction in diameter at point of rupture | do.... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.21*, ″.19 |

## No. 6829.

Marks, $\frac{A\ 55}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| 25,000 | .00095 | .00025 | ..... | ..... | |
| 26,000 | .00100 | .00005 | ..... | ..... | |
| 27,000 | .00105 | .00005 | ..... | ..... | |
| 28,000 | .00110 | .00005 | ..... | ..... | |
| 29,000 | .00120 | .00010 | ..... | ..... | Elastic limit. |
| 30,000 | .01050 | .00030 | ..... | ..... | |
| 31,000 | .01140 | .00090 | ..... | ..... | |
| 32,000 | .01225 | .00085 | ..... | ..... | |
| 33,000 | .01255 | .00030 | ..... | ..... | |
| 34,000 | .01285 | .00030 | ..... | ..... | |
| 35,000 | .01425 | .00140 | ..... | ..... | |
| 36,000 | .01550 | .00125 | ..... | ..... | |
| 66,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,050 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .2650 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 80.7 |
| Position of rupture | | ″.65 from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.89*, ″.20 |

## No. 6830.

Marks, $\frac{A\ 56}{I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00075 | .00040 | ..... | ..... | |
| 22,000 | .00090 | .00015 | ..... | ..... | |
| 23,000 | .00100 | .00010 | ..... | ..... | |
| 24,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 25,000 | .00195 | .00090 | ..... | ..... | |
| 26,000 | .00575 | .00380 | ..... | ..... | |
| 27,000 | .00700 | .00125 | ..... | ..... | |
| 28,000 | .00760 | .00060 | ..... | ..... | |
| 29,000 | .00875 | .00115 | ..... | ..... | |
| 30,000 | .01000 | .00125 | ..... | ..... | |
| 31,000 | .01075 | .00075 | ..... | ..... | |
| 32,000 | .01150 | .00075 | ..... | ..... | |
| 63,900 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 63,900 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .1500 |
| Elongation per inch under strain at elastic limit | do.... | .00105 |
| Reduction in diameter at point of rupture | do.... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ".45 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ".17*, ".13 |

## No. 6926.

Marks, $\frac{A\ 56}{2\ I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00080 | .00025 | ..... | ..... | |
| 20,000 | .00055 | .00025 | ..... | ..... | |
| 30,000 | .00095 | .00040 | ..... | ..... | |
| 33,000 | .00105 | .00010 | ..... | ..... | Elastic limit. |
| 34,000 | .01300 | .01195 | ..... | ..... | |
| 35,000 | .01425 | .00125 | ..... | ..... | |
| 36,000 | .01550 | .00125 | ..... | ..... | |
| 37,000 | .01650 | .00100 | ..... | ..... | |
| 38,000 | .01800 | .00150 | ..... | ..... | |
| 68,200 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,200 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .2750 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 84.0 |
| Position of rupture | | 1″.15 from neck |
| Character of broken surface | | granular 30 per cent, dull gray amorphous 70 per cent |
| Elongation of inch sections | | ″.25, ″.30* |

## No. 6979.

Marks, $\frac{A\ 56}{2\ I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00080 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 31,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 32,000 | .00300 | .00195 | ..... | ..... | |
| 33,000 | .00340 | .00540 | ..... | ..... | |
| 34,000 | .00915 | .00075 | ..... | ..... | |
| 35,000 | .01000 | .00085 | ..... | ..... | |
| 36,000 | .01060 | .00060 | ..... | ..... | |
| 74,200 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 74,200 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ".45 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ".17,".21* |

## No. 6831.

Marks, $\frac{A\ 57}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00025 | .00010 | ..... | ..... | |
| 20,000 | .00065 | .00040 | ..... | ..... | |
| 21,000 | .00080 | .00015 | ..... | ..... | |
| 22,000 | .00095 | .00015 | ..... | ..... | Elastic limit. |
| 23,000 | .00225 | .00130 | ..... | ..... | |
| 24,000 | .00400 | .00175 | ..... | ..... | |
| 25,000 | .00525 | .00125 | ..... | ..... | |
| 26,000 | .00600 | .00075 | ..... | ..... | |
| 27,000 | .00710 | .00110 | ..... | ..... | |
| 28,000 | .00840 | .00130 | ..... | ..... | |
| 29,000 | .00950 | .00110 | ..... | ..... | |
| 30,000 | .01050 | .00100 | ..... | ..... | |
| 63,450 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 63,450 |
| Elastic limit per square inch of original section | do... | 22,000 |
| Elongation per inch after rupture | inch.. | .2750 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | ″.62 from neck |
| Character of broken surface | | granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.23, ″.32 |

## No. 7011.

Marks, $\frac{A\ 57}{2\ I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| 22,000 | .00090 | .00020 | ..... | ..... | |
| 24,000 | .00105 | .00015 | ..... | ..... | Elastic limit. |
| 25,000 | .00135 | .00030 | ..... | ..... | |
| 26,000 | .00175 | .00040 | ..... | ..... | |
| 27,000 | .00225 | .00050 | ..... | ..... | |
| 28,000 | .00310 | .00085 | ..... | ..... | |
| 29,000 | .00405 | .00095 | ..... | ..... | |
| 30,000 | .00445 | .00040 | ..... | ..... | |
| 31,000 | .00530 | .00085 | ..... | ..... | |
| 32,000 | .00600 | .00070 | ..... | ..... | |
| 71,500 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,500 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .1850 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.18*, ″.19 |

## No. 6908.

Marks, $\frac{A\ 58}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 28,000 | .00100 | .00040 | ..... | ..... | |
| 29,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 30,000 | .00360 | .00255 | ..... | ..... | |
| 31,000 | .00650 | .00290 | ..... | ..... | |
| 32,000 | .00700 | .00050 | ..... | ..... | |
| 33,000 | .00800 | .00100 | ..... | ..... | |
| 34,000 | .00900 | .00100 | ..... | ..... | |
| 70,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,600 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .0950 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .015 |
| Reduction in area after rupture, per cent of original section | | 5.7 |
| Position of rupture | | at the neck |
| Character of broken surface | | granular, dull flaky spot at the circumference |
| Elongation of inch sections | | ″.10, ″.09 |

## No. 6932.

Marks, $\overset{A\ 58}{2\ I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 29,000 | .00100 | .00040 | ..... | ..... | Elastic limit. |
| 30,000 | .00725 | .00625 | ..... | ..... | |
| 31,000 | .00800 | .00075 | ..... | ..... | |
| 32,000 | .00865 | .00065 | ..... | ..... | |
| 33,000 | .00960 | .00095 | ..... | ..... | |
| 34,000 | .01050 | .00090 | ..... | ..... | |
| 72,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,500 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .2000 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.22*, ″.18 |

## No. 6909.

Marks, $\frac{A\ 59}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 23,000 | .00085 | .00020 | ..... | ..... | Elastic limit. |
| 24,000 | .00115 | .00030 | ..... | ..... | |
| 25,000 | .00340 | .00225 | ..... | ..... | |
| 26,000 | .00450 | .00110 | ..... | ..... | |
| 27,000 | .00535 | .00085 | ..... | ..... | |
| 28,000 | .00620 | .00085 | ..... | ..... | |
| 29,000 | .00750 | .00130 | ..... | ..... | |
| 55,200 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 55,200 |
| Elastic limit per square inch of original section | do... | 23,000 |
| Elongation per inch after rupture | inch.. | .0750 |
| Elongation per inch under strain at elastic limit | do... | .00085 |
| Reduction in diameter at point of rupture | do... | .025 |
| Reduction in area after rupture, per cent of original section | | 9.5 |
| Position of rupture | | 1.″ from neck |
| Character of broken surface | | coarse granular and flaky metal |
| Elongation of inch sections | | ″.10*, ″.05 |

## No. 6933.

Marks, $\frac{A\ 59}{2\ I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00105 | .00040 | ..... | ..... | Elastic limit. |
| | .00990 | .00885 | ..... | ..... | |
| 31,000 | .01070 | .00080 | ..... | ..... | |
| 32,000 | .01190 | .00120 | ..... | ..... | |
| 33,000 | .01265 | .00075 | ..... | ..... | |
| 34,000 | .01400 | .00135 | ..... | ..... | |
| 35,000 | .01525 | .00125 | ..... | ..... | |
| 67,050 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 67,050 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .2500 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | dull silky, trace of granulation |
| Elongation of inch sections | | ″.28*, ″.22 |

## No. 6910.

Marks, $\frac{A\ 60}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | Elastic limit. |
| 31,000 | .00210 | .00110 | ..... | ..... | |
| 32,000 | .00905 | .00695 | ..... | ..... | |
| 33,000 | .01040 | .00135 | ..... | ..... | |
| 34,000 | .01085 | .00045 | ..... | ..... | |
| 35,000 | .01200 | .00115 | ..... | ..... | |
| 67,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 67,550 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .1000 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 18.2 |
| Position of rupture | | ″.60 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.13*, ″.07 |

## No. 6934.

Marks, $\overset{\text{A 60}}{\text{2 I B 15}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Guaged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | ..... | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 19,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

Tensile strength per square inch of original section.....pounds.. 19,500
Elongation per inch after rupture.....inch.. .0200
Reduction in diameter at point of rupture..... not appreciable
Position of rupture..... at middle of stem
Character of broken surface.. dull gray amorphous 10 per cent, dark blue-black serrated 90 per cent
Elongation of inch sections ..... ″.02*, ″.02*

## No. 6911.

Marks, $\frac{A\ 61}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 33,000 | .00115 | .00015 | ..... | ..... | Elastic limit. |
| 34,000 | .01025 | .00910 | ..... | ..... | |
| 35,000 | .01090 | .00065 | ..... | ..... | |
| 36,000 | .01150 | .00060 | ..... | ..... | |
| 37,000 | .01295 | .00145 | ..... | ..... | |
| 38,000 | .01375 | .00080 | ..... | ..... | |
| 73,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 73,000 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .2100 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.19, ″.23* |

## No. 6912.

Marks, $\frac{A\ 62}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00020 | .00020 | 0. | ..... | |
| 10,000 | .00045 | .00025 | ..... | ..... | |
| 20,000 | .00085 | .00040 | ..... | ..... | |
| 24,000 | .00105 | .00020 | ..... | ..... | Elastic limit. |
| 25,000 | .00145 | .00040 | ..... | ..... | |
| 26,000 | .00275 | .00130 | ..... | ..... | |
| 27,000 | .00550 | .00275 | ..... | ..... | |
| 28,000 | .00650 | .00100 | ..... | ..... | |
| 29,000 | .00775 | .00125 | ..... | ..... | |
| 67,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 67,900 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .2500 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .105 |
| Reduction in area after rupture, per cent of original section | | 37.1 |
| Position of rupture | | ″.7 from neck |
| Character of broken surface | | silky 50 per cent, granular 50 per cent |
| Elongation of inch sections | | ″.18, ″.32* |

## No. 6913.

Marks, $\frac{A\ 63}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | ..... | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 28,000 | .00085 | .00025 | ..... | ..... | |
| 29,000 | .00095 | .00010 | ..... | ..... | Elastic limit. |
| 30,000 | .00125 | .00030 | ..... | ..... | |
| | .00725 | .00600 | ..... | ..... | |
| 31,000 | .00800 | .00075 | ..... | ..... | |
| 32,000 | .00900 | .00100 | ..... | ..... | |
| 33,000 | .01050 | .00150 | ..... | ..... | |
| 34,000 | .01275 | .00225 | ..... | ..... | |
| 69,750 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,750 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .2250 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | silky, oblique |
| Elongation of inch sections | | ″.27*, ″.18 |

## No. 6948.

Marks, $\frac{A\ 64}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 31,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 32,000 | .00180 | .00075 | ..... | ..... | |
| 33,000 | .00410 | .00230 | ..... | ..... | |
| 34,000 | .00500 | .00090 | ..... | ..... | |
| 35,000 | .00575 | .00075 | ..... | ..... | |
| 36,000 | .00650 | .00075 | ..... | ..... | |
| 35,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 35,100 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.6 from neck |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.18, ″.18* |

## No. 6970.

Marks, $\frac{A\ 65}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 28,000 | .00100 | .00035 | ..... | ..... | Elastic limit. |
| 29,000 | .00150 | .00050 | ..... | ..... | |
| 30,000 | .00740 | .00590 | ..... | ..... | |
| 31,000 | .00780 | .00040 | ..... | ..... | |
| 32,000 | .00840 | .00060 | ..... | ..... | |
| 33,000 | .00910 | .00070 | ..... | ..... | |
| 72,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,400 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .1300 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.7 from neck |
| Character of broken surface | | granular, dull silky spot at the circumference; opened cracks in the stem. |
| Elongation of inch sections | | ″.12, ″.14* |

## No. 6995.

Marks, $\frac{A\ 65}{2\ I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 34,000 | .00115 | .00015 | ..... | ..... | Elastic limit |
| 35,000 | .00740 | .00625 | ..... | ..... | |
| 36,000 | .00885 | .00145 | ..... | ..... | |
| 37,000 | .00950 | .00065 | ..... | ..... | |
| 38,000 | .01000 | .00050 | ..... | ..... | |
| 39,000 | .01090 | .00090 | ..... | ..... | |
| 77,900 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 77,900 |
| Elastic limit per square inch of original section | do... | 34,000 |
| Elongation per inch after rupture | inch.. | .2800 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular 55 per cent, silky 45 per cent |
| Elongation of inch sections | | ″.24*, ″.22* |

## No. 6975.

Marks, $\frac{A\ 66}{I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 25,000 | .00070 | .00010 | ..... | ..... | |
| 28,000 | .00090 | .00020 | ..... | ..... | Elastic limit. |
| 29,000 | .00550 | .00460 | ..... | ..... | |
| 30,000 | .00685 | .00085 | ..... | ..... | |
| 31,000 | .00670 | .00035 | ..... | ..... | |
| 32,000 | .00745 | .00075 | ..... | ..... | |
| 33,000 | .00810 | .00065 | ..... | ..... | |
| 71,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,600 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .0950 |
| Elongation per inch under strain at elastic limit | do... | .00090 |
| Reduction in diameter at point of rupture | do... | .025 |
| Reduction in area after rupture, per cent of original section | | 9.5 |
| Position of rupture | | 1" from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ".10*,".09 |

## No. 6996.

Marks, $\overset{A\ 66}{2\ I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 28,000 | .00090 | .00025 | ..... | ..... | |
| 29,000 | .00100 | .00010 | ..... | ..... | Elastic limit. |
| 30,000 | .00675 | .00575 | ..... | ..... | |
| 31,000 | .00760 | .00085 | ..... | ..... | |
| 32,000 | .00810 | .00050 | ..... | ..... | |
| 33,000 | .00950 | .00140 | ..... | ..... | |
| 34,000 | .01060 | .00110 | ..... | ..... | |
| 71,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,600 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .2850 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 80.7 |
| Position of rupture | | ″.95 from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.19, ″.28* |

## No. 7005.

Marks, $\frac{A\ 67}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 30,000 | .00105 | .00040 | ..... | ..... | |
| 34,000 | .00125 | .00020 | ..... | ..... | |
| 35,000 | .00130 | .00005 | ..... | ..... | Elastic limit. |
| 36,000 | .01115 | .00985 | ..... | ..... | |
| 37,000 | .01175 | .00060 | ..... | ..... | |
| 38,000 | .01325 | .00150 | ..... | ..... | |
| 39,000 | .01475 | .00150 | ..... | ..... | |
| 40,000 | .01600 | .00125 | ..... | ..... | |
| 72,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,000 |
| Elastic limit per square inch of original section | do... | 35,000 |
| Elongation per inch after rupture | inch.. | .2300 |
| Elongation per inch under strain at elastic limit | do... | .00130 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular, silky spot at the circumference |
| Elongation of inch sections | | ″.20*, ″.26* |

## No. 7024.

Marks, $\frac{A\ 68}{I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 26,000 | .00090 | .00030 | ..... | ..... | |
| 27,000 | .00095 | .00005 | ..... | ..... | Elastic limit. |
| 28,000 | .00850 | .00755 | ..... | ..... | |
| 29,000 | .00925 | .00075 | ..... | ..... | |
| 30,000 | .01000 | .00075 | ..... | ..... | |
| 31,000 | .01075 | .00075 | ..... | ..... | |
| 32,000 | .01175 | .00100 | ..... | ..... | |
| 65,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 65,400 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .1850 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | at middle of steam |
| Character of broken surface | | granular 60 per cent, silky oblique 40 per cent |
| Elongation of inch sections | | ".18*, ".19* |

## No. 7079.

Marks, $\frac{A\ 69}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 31,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 32,000 | .00900 | .00795 | ..... | ..... | |
| 33,000 | .00975 | .00075 | ..... | ..... | |
| 34,000 | .01050 | .00075 | ..... | ..... | |
| 35,000 | .01150 | .00100 | ..... | ..... | |
| 36,000 | .01250 | .00100 | ..... | ..... | |
| 70,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,900 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .1750 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.05 from neck |
| Character of broken surface... granular 80 per cent, silky 20 per cent; opened cracks along the stem | | |
| Elongation of inch sections | | ″.19*, ″.16 |

## No. [illegible].

**Marks.** $\frac{A\ T}{I\ B}$.
**Diameter.** ".505.
**Sectional area.** .20 square inch.
**Gauged length.** 2".

| Applied load per square inch | Elongation per inch | Reduction of area per square inch | Permanent set | Reduction of permanent set | Remarks |
|---|---|---|---|---|---|
| Pounds. | Inch. | Inch. | Inch. | Inch. | |
| [illegible] | 0. | 0. | 0. | 0. | Initial load. |
| [illegible] | .0005 | .0001 | 0. | ---------- | |
| [illegible] | .0010 | .0010 | ---------- | ---------- | |
| [illegible] | .0015 | .0015 | ---------- | ---------- | |
| [illegible] | .0020 | .0020 | ---------- | ---------- | Elastic limit. |
| [illegible] | .0030 | .0030 | ---------- | ---------- | |
| [illegible] | .0035 | .0035 | ---------- | ---------- | |
| [illegible] | .0040 | .0040 | ---------- | ---------- | |
| [illegible] |

## No. 7143.

Marks, $\frac{A\ 70}{2\ I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 32,000 | .00105 | .00005 | ..... | ..... | |
| 33,000 | .00110 | .00005 | ..... | ..... | Elastic limit. |
| | .00800 | .00690 | ..... | ..... | |
| 34,000 | .00950 | .00150 | ..... | ..... | |
| 35,000 | .01075 | .00125 | ..... | ..... | |
| 36,000 | .01125 | .00050 | ..... | ..... | |
| 37,000 | .01250 | .00125 | ..... | ..... | |
| 38,000 | .01375 | .00125 | ..... | ..... | |
| 39,000 | .01490 | .00115 | ..... | ..... | |
| 71,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 71,500 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .2150 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | ″.90 from neck |
| Character of broken surface | | granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.26*, ″.17 |

## No. 7132.

Marks, $\frac{A\ 71}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 25,000 | .00100 | .00035 | ..... | ..... | |
| 26,000 | .00110 | .00010 | ..... | ..... | |
| 27,000 | .00120 | .00010 | ..... | ..... | Elastic limit. |
| 28,000 | .00560 | .00440 | ..... | ..... | |
| 29,000 | .00615 | .00055 | ..... | ..... | |
| 30,000 | .00740 | .00125 | ..... | ..... | |
| 31,000 | .00825 | .00085 | ..... | ..... | |
| 32,000 | .00915 | .00090 | ..... | ..... | |
| 33,000 | .01000 | .00085 | ..... | ..... | |
| 69,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,000 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.30 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.19*, ″.19 |

## No. 7133.

Marks, $\frac{A\ 72}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00030 | .00015 | ..... | ..... | |
| 20,000 | .00070 | .00040 | ..... | ..... | |
| 30,000 | .00110 | .00040 | ..... | ..... | |
| 31,000 | .00115 | .00005 | ..... | ..... | Elastic limit. |
| 32,000 | .01030 | .00915 | ..... | ..... | |
| 33,000 | .01060 | .00030 | ..... | ..... | |
| 34,000 | .01115 | .00055 | ..... | ..... | |
| 35,000 | .01215 | .00100 | ..... | ..... | |
| 36,000 | .01350 | .00135 | ..... | ..... | |
| 37,000 | .01405 | .00055 | ..... | ..... | |
| 67,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 67,450 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .1450 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.16*, ″.13 |

## No. 7155.

**Marks.** $\frac{A\ 72}{2\ I\ B\ 15}$
**Diameter,** ".505.
**Sectional area,** .20 square inch.
**Gauged length,** 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongations per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 2,000 | .0000 | .0000 | 0. | ..... | |
| 3,000 | .0005 | .0005 | ..... | ..... | |
| 4,000 | .0010 | .0010 | ..... | ..... | |
| 5,000 | .0015 | .0015 | ..... | ..... | |
| 6,000 | .0020 | .0020 | ..... | ..... | |
| 7,000 | .0025 | .0025 | ..... | ..... | Elastic limit. |
| 8,000 | .0030 | .0030 | ..... | ..... | |
| 9,000 | .0035 | .0035 | ..... | ..... | |
| 10,000 | .0040 | .0040 | ..... | ..... | |
| 11,000 | .0045 | .0045 | ..... | ..... | |
| 12,000 | .0050 | .0050 | ..... | ..... | |
| 13,000 | .0055 | .0055 | ..... | ..... | |
| 14,000 | .0060 | .0060 | ..... | ..... | |
| 15,000 | .0065 | .0065 | ..... | ..... | |
| 16,000 | .0070 | .0070 | ..... | ..... | |
| 17,000 | .0075 | .0075 | ..... | ..... | |
| 18,000 | .0080 | .0080 | ..... | ..... | |
| 19,000 | .0085 | .0085 | ..... | ..... | |
| 20,000 | .0090 | .0090 | ..... | ..... | |
| 21,000 | .0095 | .0095 | ..... | ..... | |
| 22,000 | .0100 | .0100 | ..... | ..... | |
| 23,000 | .0105 | .0105 | ..... | ..... | |
| 24,000 | .0110 | .0110 | ..... | ..... | |
| 25,000 | .0115 | .0115 | ..... | ..... | |
| 26,000 | .0120 | .0120 | ..... | ..... | |
| 27,000 | .0125 | .0125 | ..... | ..... | |
| 27,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| **Tensile strength per square inch of original section** | **pounds** | **27,950** |
| **Elastic limit per square inch of original section** | **do** | **25,000** |
| **Elongation per inch after rupture** | **inch** | **.2000** |
| **Elongation per inch under strain at elastic limit** | **do** | **.0085** |
| **Reduction in diameter at point of rupture** | **do** | **.086** |
| **Reduction in area after rupture, per cent of original section** | | **34.0** |
| **Position of rupture** | | **".75 from neck** |
| **Character of broken surface** | | **silky, trace of granulation** |
| **Elongation of inch sections** | | **".31", ".21"** |

## No. 7144.

Marks, $\frac{A\ 73}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00105 | .00040 | ..... | ..... | |
| 31,000 | .00110 | .00005 | ..... | ..... | Elastic limit. |
| 32,000 | .01110 | .01000 | ..... | ..... | |
| 33,000 | .01125 | .00015 | ..... | ..... | |
| 34,000 | .01135 | .00010 | ..... | ..... | |
| 35,000 | .01160 | .00025 | ..... | ..... | |
| 36,000 | .01240 | .00080 | ..... | ..... | |
| 37,000 | .01350 | .00110 | ..... | ..... | |
| 70,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,400 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .2150 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ″.55 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.23*, ″.20 |

## No. 7145.

Marks, $\frac{A\ 74}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00105 | .00045 | ..... | ..... | |
| 32,000 | .00110 | .00005 | ..... | ..... | |
| 34,000 | .00120 | .00010 | ..... | ..... | |
| 35,000 | .00130 | .00010 | ..... | ..... | Elastic limit. |
| | .00160 | .00030 | ..... | ..... | |
| 36,000 | .01075 | .00915 | ..... | ..... | |
| 37,000 | .01095 | .00020 | ..... | ..... | |
| 38,000 | .01155 | .00060 | ..... | ..... | |
| 39,000 | .01250 | .00095 | ..... | ..... | |
| 40,000 | .01360 | .00110 | ..... | ..... | |
| 74,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 74,000 |
| Elastic limit per square inch of original section | do... | 35,000 |
| Elongation per inch after rupture | inch.. | .1650 |
| Elongation per inch under strain at elastic limit | do... | .00130 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.20 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.17*, ″.16 |

## No. 7172.

Marks, $\frac{A\ 75}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00030 | .00015 | ..... | ..... | |
| 20,000 | .00070 | .00040 | ..... | ..... | |
| 25,000 | .00090 | .00020 | ..... | ..... | |
| 27,000 | .00100 | .00010 | ..... | ..... | |
| 29,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 30,000 | .00600 | .00495 | ..... | ..... | |
| 31,000 | .00865 | .00265 | ..... | ..... | |
| 32,000 | .00920 | .00055 | ..... | ..... | |
| 33,000 | .01050 | .00130 | ..... | ..... | |
| 34.000 | .01130 | .00120 | ..... | ..... | |
| 35,000 | .01240 | .00110 | ..... | ..... | |
| 68,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,500 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1500 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | 1″.08 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.14, ″.16* |

## No. 7202.

Marks, $\frac{A\ 75}{2\ I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00080 | .00015 | ..... | ..... | |
| 20,000 | .00070 | .00040 | ..... | ..... | |
| 25,000 | .00095 | .00025 | ..... | ..... | |
| 26,000 | .00100 | .00005 | ..... | ..... | |
| 27,000 | .00110 | .00010 | ..... | ..... | Elastic limit. |
| 28,000 | .00250 | .00140 | ..... | ..... | |
| 29,000 | .00450 | .00200 | ..... | ..... | |
| 30,000 | .00590 | .00140 | ..... | ..... | |
| 31,000 | .00700 | .00110 | ..... | ..... | |
| 32,000 | .00775 | .00075 | ..... | ..... | |
| 33,000 | .00895 | .00120 | ..... | ..... | |
| 67,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds | 67,950 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .1300 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ".52 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ".15*, ".11 |

## No. 7173.

Marks, $\frac{A\ 76}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00020 | .00010 | ..... | ..... | |
| 20,000 | .00050 | .00030 | ..... | ..... | |
| 30,000 | .00095 | .00045 | ..... | ..... | |
| 31,000 | .00100 | .00005 | ..... | ..... | |
| 32,000 | .00105 | .00005 | ..... | ..... | Elastic limit. |
| 33,000 | .01050 | .00945 | ..... | ..... | |
| 34,000 | .01100 | .00050 | ..... | ..... | |
| 35,000 | .01150 | .00050 | ..... | ..... | |
| 36,000 | .01235 | .00085 | ..... | ..... | |
| 37,000 | .01340 | .00105 | ..... | ..... | |
| 38,000 | .01425 | .00085 | ..... | ..... | |
| 69,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,100 |
| Elastic limit per square inch of original section | do... | 32,000 |
| Elongation per inch after rupture | inch.. | .1:00 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.90 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.14*, ″.14 |

## No. 7203.

Marks, $\frac{A\ 76}{2\ I\ B\ 15}$.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00030 | .00015 | ..... | ..... | |
| 20,000 | .00070 | .00040 | ..... | ..... | |
| 30,000 | .00110 | .00040 | ..... | ..... | |
| 32,000 | .00120 | .00010 | ..... | ..... | |
| 33,000 | .00125 | .00005 | ..... | ..... | Elastic limit. |
| 34,000 | .00950 | .00825 | ..... | ..... | |
| 35,000 | .00990 | .00040 | ..... | ..... | |
| 36,000 | .01025 | .00035 | ..... | ..... | |
| 37,000 | .01125 | .00100 | ..... | ..... | |
| 38,000 | .01250 | .00125 | ..... | ..... | |
| 72,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,500 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | ″.1850 |
| Elongation per inch under strain at elastic limit | do... | .00125 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1″.04 from neck |
| Character of broken surface | | granular 75 per cent, silky 25 per cent |
| Elongation of inch sections | | ″.17, ″.20* |

## No. 7163.

Marks, $\frac{A\ 77}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00030 | .00015 | ..... | ..... | |
| 20,000 | .00070 | .00040 | ..... | ..... | |
| 30,000 | .00115 | .00045 | ..... | ..... | |
| 31,000 | .00120 | .00005 | ..... | ..... | Elastic limit. |
| 32,000 | .01375 | .01255 | ..... | ..... | |
| 68,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,950 |
| Elastic limit per square inch of original section | do... | 31,000 |
| Elongation per inch after rupture | inch.. | .2200 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | 1″.20 from neck |
| Character of broken surface | | granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.20, ″.24* |

## No. 7164.

Marks, $\frac{A\ 78}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00025 | .00010 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 30,000 | .00105 | .00045 | ..... | ..... | |
| 33,000 | .00115 | .00010 | ..... | ..... | |
| 34,000 | .00125 | .00010 | ..... | ..... | Elastic limit. |
| 35,000 | .01190 | .01065 | ..... | ..... | |
| 36,000 | .01250 | .00060 | ..... | ..... | |
| 37,000 | .01275 | .00025 | ..... | ..... | |
| 38,000 | .01365 | .00090 | ..... | ..... | |
| 39,000 | .01525 | .00160 | ..... | ..... | |
| 40,000 | .01650 | .00125 | ..... | ..... | |
| 69,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 69,400 |
| Elastic limit per square inch of original section | do... | 34,000 |
| Elongation per inch after rupture | inch.. | .2100 |
| Elongation per inch under strain at elastic limit | do... | .00125 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.50 from neck |
| Character of broken surface | | granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.18, ″.24* |

## No. 7191.

Marks, $\frac{A\ 79}{I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".



*General summary.*

| | | |
|---|---|---|
| Tensile stength per square inch of original section | pounds.. | 76,100 |
| Elastic limit per square inch of original section | do.... | 88,000 |
| Elongation per inch after rupture | inch.. | .1709 |
| Elongation per inch under strain at elastic limit | do.... | .00120 |
| Reduction in diameter at point of rupture | do.... | .065 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1".10 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ".17, ".17 |

## No. 7192.

Marks, $\frac{A\ 80}{I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 22,000 | .00070 | .00010 | ..... | ..... | Elastic limit. |
| 23,000 | .00155 | .00085 | ..... | ..... | |
| 24,000 | .00220 | .00065 | ..... | ..... | |
| 25,000 | .00350 | .00130 | ..... | ..... | |
| 26,000 | .00425 | .00075 | ..... | ..... | |
| 27,000 | .00515 | .00090 | ..... | ..... | |
| 67,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 67,400 |
| Elastic limit per square inch of original section | do... | 22,000 |
| Elongation per inch after rupture | inch.. | .2300 |
| Elongation per inch under strain at elastic limit | do.. | .00070 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.70 |
| Position of rupture | | 1".10 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ".20, ".26* |

## No. 7193.

Marks, $\frac{A\ 81}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 22,000 | .00075 | .00010 | ..... | ..... | |
| 23,000 | .00080 | .00005 | ..... | ..... | Elastic limit. |
| 24,000 | .00120 | .00040 | ..... | ..... | |
| 25,000 | .00155 | .00035 | ..... | ..... | |
| 26,000 | .00250 | .00095 | ..... | ..... | |
| 27,000 | .00390 | .00140 | ..... | ..... | |
| 28,000 | .00500 | .00110 | ..... | ..... | |
| 29,000 | .00600 | .00100 | ..... | ..... | |
| 67,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 67,500 |
| Elastic limit per square inch of original section | do... | 23,000 |
| Elongation per inch after rupture | inch.. | .1750 |
| Elongation per inch under strain at elastic limit | do... | .00080 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | 1″.18 from neck |
| Character of broken surface | | granular, silvery luster, silky spot at the circumference |
| Elongation of inch sections | | ″.17, ″.18* |

# OUTER BASES—15-POUNDER GUN MOUNTS.

## STEEL CASTINGS.

## No. 6959.

Marks, $\frac{D\ 13}{O\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00080 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 30,000 | .00095 | .00030 | ..... | ..... | |
| 33,000 | .00105 | .00010 | ..... | ..... | Elastic limit. |
| 34,000 | .00200 | .00095 | ..... | ..... | |
| 35,000 | .00530 | .00330 | ..... | ..... | |
| 36,000 | .01050 | .00520 | ..... | ..... | |
| 37,000 | .01150 | .00100 | ..... | ..... | |
| 38,000 | .01250 | .00100 | ..... | ..... | |
| 63,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 63,000 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .1100 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ″.7 from neck |
| Character of broken surface | | dull amorphous oblique, small granular spots |
| Elongation of inch sections | | ″.15*, ″.07 |

## No. 6960.

Marks, $\begin{matrix} D\ 14 \\ O\ B\ 15 \end{matrix}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00095 | .00030 | ..... | ..... | |
| 35,000 | .00130 | .00035 | ..... | ..... | |
| 36,000 | .00135 | .00005 | ..... | ..... | Elastic limit. |
| 37,000 | .01225 | .01090 | ..... | ..... | |
| 38,000 | .01255 | .00030 | ..... | ..... | |
| 39,000 | .01325 | .00070 | ..... | ..... | |
| 40,000 | .01450 | .00125 | ..... | ..... | |
| 41,000 | .01575 | .00125 | ..... | ..... | |
| 66,550 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 66,550 |
| Elastic limit per square inch of original section | do... | 36,000 |
| Elongation per inch after rupture | inch.. | .1100 |
| Elongation per inch under strain at elastic limit | do... | .00135 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular 50 per cent, dull amorphous oblique 50 per cent |
| Elongation of inch sections | | ″.13*, ″.08 |

## No. 6961.

Marks, $\frac{D\ 29}{O\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| 25,000 | .00095 | .00025 | ..... | ..... | |
| 26,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 27,000 | .00150 | .00050 | ..... | ..... | |
| 28,000 | .00245 | .00095 | ..... | ..... | |
| 29,000 | .00330 | .00085 | ..... | ..... | |
| 30,000 | .00425 | .00095 | ..... | ..... | |
| 31,000 | .00550 | .00125 | ..... | ..... | |
| 59,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 59,100 |
| Elastic limit per square inch of original section | do... | 26,000 |
| Elongation per inch after rupture | inch.. | .0700 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 18.2 |
| Position of rupture | | ″.6 from neck |
| Character of broken surface | | granular, spongy spot at circumference |
| Elongation of inch sections | | ″.05, ″.09* |

**Marks,** $\frac{D\ 40}{O\ B\ 15}$
**Diameter,** ″.505.
**Sectional area,** .20 square inch.
**Gauged length,** 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00035 | .00020 | ..... | ..... | |
| 20,000 | .00075 | .00040 | ..... | ..... | Elastic limit. |
| 21,000 | .00135 | .00060 | ..... | ..... | |
| 22,000 | .00195 | .00060 | ..... | ..... | |
| 23,000 | .00255 | .00060 | ..... | ..... | |
| 24,000 | .00340 | .00085 | ..... | ..... | |
| 25,000 | .00485 | .00145 | ..... | ..... | |
| 58,200 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 58,200 |
| Elastic limit per square inch of original section | inch.. | 20,000 |
| Elongation per inch after rupture | do... | .2600 |
| Elongation per inch under strain at elastic limit | do... | .00075 |
| Reduction in diameter at point of rupture | do... | .075 |
| Reduction in area after rupture, per cent of original section | | 27.4 |
| Position of rupture | | ″.5 from neck |
| Character of broken surface | | granular, dull spongy spot at circumference |
| Elongation of inch sections | | ″.22, ″.30* |

## No. 6963.

Marks, $\frac{D\ 46}{O\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | Elastic limit. |
| 21,000 | .00105 | .00045 | ..... | ..... | |
| 22,000 | .00155 | .00050 | ..... | ..... | |
| 23,000 | .00205 | .00050 | ..... | ..... | |
| 24,000 | .00275 | .00070 | ..... | ..... | |
| 25,000 | .00405 | .00130 | ..... | ..... | |
| 58,350 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 58,350 |
| Elastic limit per square inch of original section | do... | 20,000 |
| Elongation per inch after rupture | inch.. | .2050 |
| Elongation per inch under strain at elastic limit | do... | .00060 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | granular, dull silky center |
| Elongation of inch sections | | ″.23*, ″.18 |

## No. 6974.

Marks, $\frac{D\ 49}{O\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 29,000 | .00095 | .00030 | ..... | ..... | Elastic limit. |
| 30,000 | .00205 | .00110 | ..... | ..... | |
| 31,000 | .00400 | .00195 | ..... | ..... | |
| 32,000 | .00490 | .00090 | ..... | ..... | |
| 33,000 | .00565 | .00075 | ..... | ..... | |
| 34,000 | .00640 | .00075 | ..... | ..... | |
| 80,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 80,400 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1600 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | 0.45 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ".15*, ".17* |

## No. 6985.

Marks, $\frac{D\ 50}{O\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00070 | .00035 | ..... | ..... | |
| 30,000 | .00100 | .00030 | ..... | ..... | |
| 33,000 | .00110 | .00010 | ..... | ..... | Elastic limit. |
| 34,000 | .00140 | .00030 | ..... | ..... | |
| 35,000 | .01165 | .01025 | ..... | ..... | |
| 36,000 | .01230 | .00065 | ..... | ..... | |
| 37,000 | .01300 | .00070 | ..... | ..... | |
| 38,000 | .01450 | .00150 | ..... | ..... | |
| 55,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 55,100 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .0600 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .025 |
| Reduction in area after rupture, per cent of original section | | 9.5 |
| Position of rupture | | ″.55 from neck |
| Character of broken surface | | dull amorphous, oblique; opened cracks along the stem |
| Elongation of inch sections | | ″.11*, ″.05 |

## No. 7027.

Marks, $\overset{D\ 51}{O\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00025 | .00020 | ..... | ..... | |
| 20,000 | .00055 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00045 | ..... | ..... | Elastic limit. |
| 31,000 | .00165 | .00065 | ..... | ..... | |
| 32,000 | .00245 | .00080 | ..... | ..... | |
| 33,000 | .00295 | .00050 | ..... | ..... | |
| 34,000 | .00320 | .00025 | ..... | ..... | |
| 35,000 | .00355 | .00035 | ..... | ..... | |
| 99,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 99,100 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .1150 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ″.50 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ″.10, ″.13* |

## No. 7028.

Marks, $\frac{D\ 52}{O\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 25,000 | .00090 | .00025 | ..... | ..... | |
| 26,000 | .00095 | .00005 | ..... | ..... | Elastic limit. |
| 27,000 | .00175 | .00080 | ..... | ..... | |
| 28,000 | .00460 | .00285 | ..... | ..... | |
| 29,000 | .00600 | .00140 | ..... | ..... | |
| 30,000 | .00705 | .00105 | ..... | ..... | |
| 31,000 | .00775 | .00070 | ..... | ..... | |
| 67,500 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 67,500 |
| Elastic limit per square inch of original section | do... | 26,000 |
| Elongation per inch after rupture | inch.. | .1100 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 18.2 |
| Position of rupture | | ″.25 from neck |
| Character of broken surface | | granular at circumference, dull amorphous center |
| Elongation of inch sections | | ″.10, ″.12* |

## No. 7081.

Marks, $\frac{D\ 53}{O\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00080 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 33,000 | .00115 | .00015 | ..... | ..... | |
| 34,000 | .00120 | .00005 | ..... | ..... | Elastic limit. |
| 35,000 | .00860 | .00740 | ..... | ..... | |
| 36,000 | .00965 | .00105 | ..... | ..... | |
| 37,000 | .01075 | .00110 | ..... | ..... | |
| 38,000 | .01150 | .00075 | ..... | ..... | |
| 39,000 | .01250 | .00100 | ..... | ..... | |
| 74,750 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 74,750 |
| Elastic limit per square inch of original section | do... | 34,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | 1.″05 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.19, ″.19* |

## No. 7082.

Marks, $\frac{D\ 54}{O\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 28,000 | .00095 | .00030 | ..... | ..... | |
| 29,000 | .00105 | .00010 | ..... | ..... | Elastic limit. |
| 30,000 | .00140 | .00035 | ..... | ..... | |
| 31,000 | .00160 | .00020 | ..... | ..... | |
| 32,000 | .00550 | .00390 | ..... | ..... | |
| 33,000 | .00700 | .00150 | ..... | ..... | |
| 34,000 | .00810 | .00110 | ..... | ..... | |
| 67,550 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 67,550 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .0950 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reductton in area after rupture, per cent of original section | | 18.2 |
| Position of rupture | | ″.6 from neck |
| Character of broken surface | | granular, silky spot on one side having a cavity at center ″.08 diameter. |
| Elongation of inch sections | | ″.10*, ″.09 |

## No. 7170.

Marks, $\frac{D\ 54}{2\ O\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00020 | .00010 | ..... | ..... | |
| 20,000 | .00060 | .00040 | ..... | ..... | |
| 25,000 | .00080 | .00020 | ..... | ..... | |
| 26,000 | .00090 | .00010 | ..... | ..... | |
| 27,000 | .00100 | .00010 | ..... | ..... | Elastic limit. |
| 28,000 | .00220 | .00120 | ..... | ..... | |
| 29,000 | .00310 | .00090 | ..... | ..... | |
| 30,000 | .00560 | .00250 | ..... | ..... | |
| 31,000 | .00700 | .00140 | ..... | ..... | |
| 32,000 | .00770 | .00070 | ..... | ..... | |
| 33,000 | .00840 | .00070 | ..... | ..... | |
| 34,000 | .00900 | .00060 | ..... | ..... | |
| 72,850 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,850 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .1600 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.16, ″.16* |

## No. 7089.

Marks, $\frac{D\ 55}{O\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 28,000 | .00100 | .00035 | ..... | ..... | Elastic limit. |
| 29,000 | .00160 | .00060 | ..... | ..... | |
| 30,000 | .00295 | .00135 | ..... | ..... | |
| 31,000 | .00345 | .00050 | ..... | ..... | |
| 32,000 | .00450 | .00105 | ..... | ..... | |
| 33,000 | .00500 | .00050 | ..... | ..... | |
| 72,050 | ..... | ..... | ..... | ..... | Tensile strengtn. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,050 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .1350 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ″.45 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.12, ″15* |

## No. 7130.

Marks, $\frac{D\ 56}{O\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00105 | .00040 | ..... | ..... | |
| 32,000 | .00115 | .00010 | ..... | ..... | |
| 33,000 | .00120 | .00005 | ..... | ..... | Elastic limit. |
| 34,000 | .00625 | .00505 | ..... | ..... | |
| 35,000 | .00650 | .00025 | ..... | ..... | |
| 36,000 | .00695 | .00045 | ..... | ..... | |
| 37,000 | .00760 | .00065 | ..... | ..... | |
| 38,000 | .00855 | .00095 | ..... | ..... | |
| 39,000 | .00925 | .00070 | ..... | ..... | |
| 81,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 81,000 |
| Elastic limit per square inch of original section | do... | 33,000 |
| Elongation per inch after rupture | inch.. | .1750 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | 1".03 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ".18*, ".17 |

## No. 7131.

Marks, $\frac{D\ 57}{O\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00020 | .00015 | ..... | ..... | |
| 20,000 | .00055 | .00035 | ..... | ..... | |
| 30,000 | .00100 | .00045 | ..... | ..... | |
| 33,000 | .00105 | .00005 | ..... | ..... | |
| 34,000 | .00110 | .00005 | ..... | ..... | Elastic limit. |
| 35,000 | .00850 | .00740 | ..... | ..... | |
| 36,000 | .00950 | .00100 | ..... | ..... | |
| 37,000 | .01050 | .00100 | ..... | ..... | |
| 38,000 | .01100 | .00050 | ..... | ..... | |
| 39,000 | .01250 | .00150 | ..... | ..... | |
| 40,000 | .01300 | .00050 | ..... | ..... | |
| 73,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 73,950 |
| Elastic limit per square inch of original section | do... | 34,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.70 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.17, ″.19* |

## No. 7146.

Marks, $\overset{D\ 58}{O\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00015 | .00010 | ..... | ..... | |
| 20,000 | .00045 | .00030 | ..... | ..... | |
| 30,000 | .00075 | .00030 | ..... | ..... | |
| 32,000 | .00090 | .00015 | ..... | ..... | |
| 33,000 | .00095 | .00005 | ..... | ..... | |
| 34,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| | .00700 | .00600 | ..... | ..... | |
| 35,000 | .00780 | .00080 | ..... | ..... | |
| 36,000 | .00850 | .00070 | ..... | ..... | |
| 37,000 | .00950 | .00100 | ..... | ..... | |
| 38,000 | .01050 | .00100 | ..... | ..... | |
| 39,000 | .01100 | .00050 | ..... | ..... | |
| 40,000 | .01200 | .00100 | ..... | ..... | |
| 74,900 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 74,900 |
| Elastic limit per square inch of original section | do... | 34,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.55 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.16, ″.20* |

## No. 7171.

Marks, $\frac{D\ 59}{O\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00030 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 25,000 | .00080 | .00020 | ..... | ..... | |
| 27,000 | .00090 | .00010 | ..... | ..... | |
| 29,000 | .00100 | .00010 | ..... | ..... | Elastic limit. |
| 30,000 | .00800 | .00700 | ..... | ..... | |
| 31,000 | .00815 | .00015 | ..... | ..... | |
| 32,000 | .00890 | .00075 | ..... | ..... | |
| 33,000 | .00990 | .00100 | ..... | ..... | |
| 34,000 | .01060 | .00070 | ..... | ..... | |
| 35,000 | .01190 | .00130 | ..... | ..... | |
| 68,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,950 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1600 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.25 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.15, ″.17* |

## No. 7162.

Marks, $\frac{D\ 60}{O\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | ..... | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00070 | .00040 | ..... | ..... | |
| 24,000 | .00085 | .00015 | ..... | ..... | |
| 26,000 | .00095 | .00010 | ..... | ..... | |
| 28,000 | .00100 | .00005 | ..... | ..... | |
| 29,000 | .00105 | .00005 | ..... | ..... | |
| 30,000 | .00115 | .00010 | ..... | ..... | Elastic limit. |
| 31,000 | .00400 | .00285 | ..... | ..... | |
| 32,000 | .00580 | .00180 | ..... | ..... | |
| 33,000 | .00660 | .00080 | ..... | ..... | |
| 34,000 | .00750 | .00090 | ..... | ..... | |
| 35,000 | .00850 | .00100 | ..... | ..... | |
| 36,000 | .00900 | .00050 | ..... | ..... | |
| 75,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 75,500 |
| Elastic limit per square inch of original section | do... | 30,000 |
| Elongation per inch after rupture | inch.. | .1700 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.90 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.17, ″.17* |

## No. 7180.

Marks, $\frac{D\ 61}{O\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00025 | .00010 | ..... | ..... | |
| 20,000 | .00065 | .00040 | ..... | ..... | |
| 25,000 | .00085 | .00020 | ..... | ..... | |
| 27,000 | .00095 | .00010 | ..... | ..... | |
| 28,000 | .00100 | .00005 | ..... | ..... | |
| 29,000 | .00110 | .00010 | ..... | ..... | Elastic limit. |
| 30,000 | .00770 | .00660 | ..... | ..... | |
| 31,000 | .00850 | .00080 | ..... | ..... | |
| 32,000 | .00950 | .00100 | ..... | ..... | |
| 33,000 | .01050 | .00100 | ..... | ..... | |
| 34,000 | .01225 | .00175 | ..... | ..... | |
| 35,000 | .01300 | .00075 | ..... | ..... | |
| 64,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 64,950 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1350 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ″.70 from neck |
| Character of broken surface | | granular 60 per cent, silky 40 per cent |
| Elongation of inch sections | | ″.12, ″.15* |

Marks, $\frac{D\ 62}{O\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00030 | .00015 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 25,000 | .00085 | .00020 | ..... | ..... | |
| 27,000 | .00095 | .00010 | ..... | ..... | |
| 29,000 | .00105 | .00010 | ..... | ..... | Elastic limit. |
| 30,000 | .00885 | .00780 | ..... | ..... | |
| 31,000 | .00950 | .00065 | ..... | ..... | |
| 32,000 | .01000 | .00050 | ..... | ..... | |
| 33,000 | .01100 | .00100 | ..... | ..... | |
| 34,000 | .01200 | .00100 | ..... | ..... | |
| 35,000 | .01325 | .00125 | ..... | ..... | |
| 65,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 65,000 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1500 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ".70 from neck |
| Character of broken surface | | silky, trace of granulation |
| Elongation of inch sections | | ".15, ".15" |

## No. 7182.

Marks, $\frac{D\ 63}{O\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 30,000 | .00105 | .00040 | ..... | ..... | |
| 31,000 | .00110 | .00005 | ..... | ..... | |
| 32,000 | .00115 | .00005 | ..... | ..... | Elastic limit. |
| 33,000 | .00800 | .00685 | ..... | ..... | |
| 34,000 | .00915 | .00115 | ..... | ..... | |
| 35,000 | .00965 | .00050 | ..... | ..... | |
| 36,000 | .01030 | .00065 | ..... | ..... | |
| 37,000 | .01150 | .00120 | ..... | ..... | |
| 70,100 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 70,100 |
| Elastic limit per square inch of original section | do... | 32,000 |
| Elongation per inch after rupture | inch.. | .1950 |
| Elongation per inch under strain at elastic limit | do... | .00115 |
| Reduction in diameter at point of rupture | do... | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ″.70 from neck |
| Character of broken surface | | granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.21*, ″.18 |

## No. 7183.

Marks. $\frac{D\ 44}{C\ B\ 3}$
Diameter. ".505.
Sectional area. .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Extension per inch. | Successive extension per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| Pounds. | Inch. | Inch. | Inch. | Inch. | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .0015 | .0015 | 0. | ---------- | |
| 10,000 | .0030 | .0015 | ---------- | ---------- | |
| 15,000 | .0045 | .0015 | ---------- | ---------- | |
| 20,000 | .0060 | .0015 | ---------- | ---------- | |
| 32,000 | .0115 | .0055 | ---------- | ---------- | Elastic limit. |
| 22,000 | .0160 | .0045 | ---------- | ---------- | |
| 24,000 | .0200 | .0040 | ---------- | ---------- | |
| 25,000 | .0250 | .0050 | ---------- | ---------- | |
| 26,000 | .0295 | .0045 | ---------- | ---------- | |
| 27,000 | .0335 | .0040 | ---------- | ---------- | |
| 73,000 | ---------- | ---------- | ---------- | ---------- | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds | 73,000 |
| Elastic limit per square inch of original section | do | 32,000 |
| Elongation per inch after rupture | inch | .1750 |
| Elongation per inch under strain at elastic limit | do | .00115 |
| Reduction in diameter at point of rupture | do | .055 |
| Reduction in area after rupture, per cent of original section | | 20.5 |
| Position of rupture | | ".95 from neck |
| Character of broken surface | | granular 90 per cent, silky 10 per cent |
| Elongation of inch sections | | ".16, ".19" |

## No. 7190.

Marks, $\overset{D\ 65}{O\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00030 | .00015 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 25,000 | .00090 | .00025 | ..... | ..... | |
| 26,000 | .00095 | .00005 | ..... | ..... | |
| 27,000 | .00100 | .00005 | ..... | ..... | Elastic limit. |
| 28,000 | .00350 | .00250 | ..... | ..... | |
| 29,000 | .00590 | .00240 | ..... | ..... | |
| 30,000 | .00700 | .00110 | ..... | ..... | |
| 31,000 | .00775 | .00075 | ..... | ..... | |
| 32,000 | .00830 | .00055 | ..... | ..... | |
| 64,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 64,400 |
| Elastic limit per square inch of original section | do... | 27,000 |
| Elongation per inch after rupture | inch.. | .0750 |
| Elongation per inch under strain at elastic limit | do... | .00100 |
| Reduction in diameter at point of rupture | do... | .025 |
| Reduction in area after rupture, per cent of original section | | 9.5 |
| Position of rupture | | ″.05 from neck |
| Character of broken surface | | granular 85 per cent, silky 15 per cent |
| Elongation of inch sections | | ″.06, ″.09* |

## No. 7201.

Marks, $\frac{D\ 66}{O\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | .0 | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00030 | .00015 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 25,000 | .00085 | .00020 | ..... | ..... | |
| 27,000 | .00095 | .00010 | ..... | ..... | |
| 29,000 | .00110 | .00015 | ..... | ..... | Elastic limit. |
| 30,000 | .00150 | .00040 | ..... | ..... | |
| 31,000 | .00600 | .00450 | ..... | ..... | |
| 32,000 | .00675 | .00075 | ..... | ..... | |
| 33,000 | .00725 | .00050 | ..... | ..... | |
| 34,000 | .00850 | .00125 | ..... | ..... | |
| 35,000 | .00950 | .00100 | ..... | ..... | |
| 72,400 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 72,400 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .1550 |
| Elongation per inch under strain at elastic limit | do... | .00110 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | ″.20 from neck |
| Character of broken surface | | granular 80 per cent, silky 20 per cent |
| Elongation of inch sections | | ″.16⁵, ″.15 |

# PISTON RODS—15-POUNDER GUN MOUNTS.

## STEEL FORGINGS.

## No. 6885.

Marks, $\frac{A\ 81}{P\ R\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 38,000 | .00135 | .00035 | ..... | ..... | |
| 39,000 | .00140 | .00005 | ..... | ..... | Elastic limit. |
| 40,000 | .01350 | .01210 | ..... | ..... | |
| 41,000 | .01390 | .00040 | ..... | ..... | |
| 42,000 | .01450 | .00060 | ..... | ..... | |
| 43,000 | .01560 | .00110 | ..... | ..... | |
| 44,000 | .01660 | .00100 | ..... | ..... | |
| 77,500 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 77,500 |
| Elastic limit per square inch of original section | do... | 39,000 |
| Elongation per inch after rupture | inch.. | .2700 |
| Elongation per inch under strain at elastic limit | do... | .00140 |
| Reduction in diameter at point of rupture | do... | .115 |
| Reduction in area after rupture, per cent of original section | | 40.3 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.82*, ″.22 |

## No. 6886.

Marks, $\frac{A\ 82}{P\ R\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00085 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 38,000 | .00140 | .00040 | ..... | ..... | Elastic limit. |
| | .01200 | .01060 | | | |
| 39,000 | .01240 | .00040 | ..... | ..... | |
| 40,000 | .01290 | .00050 | ..... | ..... | |
| 41,000 | .01350 | .00060 | ..... | ..... | |
| 42,000 | .01450 | .00100 | ..... | ..... | |
| 43,000 | .01570 | .00120 | ..... | ..... | |
| 78,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 78,050 |
| Elastic limit per square inch of original section | do.... | 38,000 |
| Elongation per inch after rupture | inch.. | .2700 |
| Elongation per inch under strain at elastic limit | do.... | .00140 |
| Reduction in diameter at point of rupture | do.... | .115 |
| Reduction in area after rupture, per cent of original section | | 40.3 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.32*, ″.22 |

# CASEMATE MOUNTS—15-POUNDER GUNS.

## STEEL CASTINGS.

## No. 6462.

Marks, $\frac{A\ 1}{C\ M\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 68,950 |
| Elastic limit per square inch of original section | do... | 24,000 |
| Elongation per inch after rupture | inch.. | .1800 |
| Elongation per inch under strain at elastic limit | do... | .001150 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | #.70 from neck |
| Character of broken surface | | fine granular, dull spot at the circumference |
| Elongation of inch sections | | #.18, #.18* |

## No. 6463.

Marks, $\frac{A\ 2}{C\ M\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00040 | .00025 | ..... | ..... | |
| 15,000 | .00060 | .00020 | ..... | ..... | |
| 18,000 | .00085 | .00025 | ..... | ..... | |
| 19,000 | .00095 | .00010 | ..... | ..... | |
| 20,000 | .00105 | .00010 | ..... | ..... | Elastic limit. |
| 21,000 | .00140 | .00035 | ..... | ..... | |
| 22,000 | .00150 | .00010 | ..... | ..... | |
| 23,000 | .00180 | .00030 | ..... | ..... | |
| 24,000 | .00210 | .00030 | ..... | ..... | |
| 25,000 | .00275 | .00065 | ..... | ..... | |
| 26,000 | .00390 | .00115 | ..... | ..... | |
| 27,000 | .00450 | .00060 | ..... | ..... | |
| 28,000 | .00560 | .00110 | ..... | ..... | |
| 29,000 | .00640 | .00080 | ..... | ..... | |
| 30,000 | .00775 | .00135 | ..... | ..... | |
| 31,000 | .00855 | [illegible] | ..... | ..... | |
| 32,000 | .00975 | .00120 | ..... | ..... | |
| 33,000 | .01075 | [illegible] | ..... | ..... | |
| 54,850 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 54,850 |
| Elastic limit per square inch of original section | do... | 20,000 |
| Elongation per inch after rupture | inch.. | .0800 |
| Elongation per inch under strain at elastic limit | do... | .00105 |
| Reduction in diameter at point of rupture | do... | .045 |
| Reduction in area after rupture, per cent of original section | | 16.9 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | granular 50 per cent, dull silky 50 per cent |
| Elongation of inch sections | | ″.07, ″.09* |

## No. 6518.

Marks, $\frac{A\ 2}{2\ C\ M\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.
Bruised specimen.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 15,000 | .00055 | .00020 | ..... | ..... | |
| 20,000 | .00080 | .00025 | .00010 | .00010 | |
| 21,000 | .00085 | .00005 | ..... | ..... | |
| 22,000 | .00090 | .00005 | ..... | ..... | Elastic limit. |
| 23,000 | .00150 | .00060 | ..... | ..... | |
| 24,000 | .00210 | .00060 | ..... | ..... | |
| 25,000 | .00315 | .00105 | ..... | ..... | |
| 26,000 | .00435 | .00120 | ..... | ..... | |
| 27,000 | .00530 | .00095 | ..... | ..... | |
| 28,000 | .00625 | .00095 | ..... | ..... | |
| 61,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 61,950 |
| Elastic limit per square inch of original section | do... | 22,000 |
| Elongation per inch after rupture | inch.. | .1300 |
| Elongation per inch under strain at elastic limit | do... | .00090 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | ″.25 from neck |
| Character of broken surface | | granular, with dull amorphous spot at the circumference |
| Elongation of inch sections | | ″.14*, ″.12 |

## *TABULATION OF STEEL SPECIMENS FROM 6-POUNDER AND 15-POUNDER GUN MOUNTS (STEMS 8″ LONG).*

### PIVOT SOCKETS, 6-POUNDER GUN MOUNTS, STEEL CASTINGS.

| No. of test. | Marks. | Diameter. | Sectional area. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation in 2 inches. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. |
|---|---|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Per cent.* | *Per cent.* | | ″ ″ |
| 6453 | A 25 P S 6 | .505 | .20 | 28,000 | 64,950 | 25.5 | 30.7 | | .27*, .24 |
| 6454 | A 26 P S 6 | .505 | .20 | 30,000 | 64,900 | 22.5 | 27.4 | | .28*, .22 |
| 6455 | A 27 P S 6 | .505 | .20 | 27,000 | 64,500 | 26.0 | 30.7 | | .30*, .22 |
| 6456 | A 28 P S 6 | .505 | .20 | 21,000 | 52,350 | 36.5 | 59.8 | Silky | .29, .44* |
| 6473 | A 28 2 P S 6 | .505 | .20 | 20,000 | 51,450 | 29.5 | 40.3 | do | .35*, .24 |
| 6457 | A 29 P S 6 | .505 | .20 | 19,000 | 51,900 | 37.0 | 59.8 | do | .41*, .33 |
| 6474 | A 29 2 P S 6 | .505 | .20 | 24,000 | 50,900 | 35.0 | 54.6 | do | .40*, .30 |
| 6612 | A 30 P S 6 | .505 | .20 | 27,000 | 53,550 | 37.0 | 54.6 | do | .30, .44* |
| 6714 | A 30 2 P S 6 | .505 | .20 | 28,000 | 51,300 | 30.5 | 40.3 | Dull silky | .25, .36* |
| 6746 | A 31 2 P S 6 | .505 | .20 | 30,000 | 64,900 | 8.5 | 9.5 | Granular 85 per cent, dull silky 15 per cent | .07, .10* |
| 6712 | A 32 P S 6 | .505 | .20 | 19,000 | 51,000 | 37.0 | 54.6 | Silky | .26, .48* |
| 6713 | A 33 P S 6 | .505 | .20 | 20,000 | 55,400 | 32.5 | 43.3 | do | .34, .31* |
| 6715 | A 34 P S 6 | .505 | .20 | 31,000 | 66,550 | 24.5 | 30.7 | Dull silky, opened cracks along the stem | .23*, .21 |
| 6716 | A 35 P S 6 | .505 | .20 | 31,000 | 66,000 | 25.0 | 30.7 | Silky | .22, .28* |
| 6747 | A 36 P S 6 | .505 | .20 | 29,000 | 75,600 | 14.5 | 16.9 | Granular 60 per cent, dull silky 40 per cent | .16*, .13 |
| 6748 | A 37 P S 6 | .505 | .20 | 28,000 | 60,500 | 29.0 | 43.3 | Silky | .28, .30* |
| 6749 | A 38 P S 6 | .505 | .20 | 28,000 | 75,050 | 20.5 | 23.9 | Granular 85 per cent, dull silky 15 per cent | .18, .23* |
| 6758 | A 39 P S 6 | .505 | .20 | 25,000 | 68,050 | 14.5 | 16.9 | Granular, silky spot at circumference | .16*, .13 |
| 6750 | A 40 P S 6 | .505 | .20 | 25,000 | 67,550 | 20.5 | 20.5 | do | .19, .22* |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 6760 | A 41 P S 6 | .505 | .20 | 24,000 | 68,200 | 25.0 | 30.7 | Granular 60 per cent, silky 40 per cent | .22, .28* |
| 6761 | A 42 P S 6 | .505 | .20 | 21,000 | 69,550 | 17.0 | 16.9 | Granular, silky spot at circumference | .19*, .15 |
| 6781 | A 42 2 P S 6 | .505 | .20 | 23,000 | 61,300 | 8.5 | 13.2 | Granular, small spongy spot at circumference | .09, .08* |
| 6762 | A 43 P S 6 | .505 | .20 | 23,000 | 68,500 | 26.5 | 34.0 | Silky 60 per cent, granular 40 per cent | .28*, .25* |
| 6768 | A 44 P S 6 | .505 | .20 | 26,000 | 72,550 | 18.0 | 20.5 | Granular | .16, .20* |
| 6782 | A 45 P S 6 | .505 | .20 | 32,000 | 74,000 | 20.5 | 23.9 | Granular, dull spot at circumference | .23*, .18 |
| 6783 | A 46 P S 6 | .505 | .20 | 32,000 | 75,850 | 18.0 | 20.5 | Granular, silky spot at circumference | .17, .19* |
| 6784 | A 47 P S 6 | .505 | .20 | 29,000 | 68,900 | 21.5 | 27.4 | Granular 85 per cent, silky 15 per cent | .20, .28* |
| 6785 | A 48 P S 6 | .505 | .20 | 28,000 | 69,600 | 22.5 | 23.9 | Granular, silky spot at the circumference | .21, .24* |
| 6804 | A 49 P S 6 | .505 | .20 | 28,000 | 67,900 | 25.0 | 30.7 | Granular 50 per cent, silky 50 per cent | .18, .32* |
| 6805 | A 50 P S 6 | .505 | .20 | 27,000 | 75,100 | 17.5 | 20.5 | Granular 80 per cent, silky 20 per cent | .16, .19* |
| 6806 | A 51 P S 6 | .505 | .20 | 33,000 | 69,650 | 25.0 | 27.4 | Dull silky 60 per cent, granular 40 per cent | .24, .26* |
| 6924 | A 52 P S 6 | .505 | .20 | 36,000 | 75,900 | 19.0 | 27.4 | Granular, silky spot at circumference | .23*, .15 |
| 6937 | A 53 P S 6 | .505 | .20 | 26,000 | 66,550 | 21.0 | 23.9 | .....do | .23*, .19 |
| 6918 | A 54 P S 6 | .505 | .20 | 26,000 | 66,300 | 23.5 | 27.4 | Granular | .24, .23* |
| 6938 | A 55 P S 6 | .505 | .20 | 27,000 | 65,800 | 27.0 | 34.0 | Silky | .24, .30* |
| 6939 | A 56 P S 6 | .505 | .20 | 31,000 | 72,500 | 24.5 | 30.7 | Granular 60 per cent, silky 40 per cent | .22, .27* |
| 6940 | A 57 P S 6 | .505 | .20 | 34,000 | 84,000 | 18.5 | 20.5 | Granular, silky spot at circumference | .19, .18* |
| 6941 | A 58 P S 6 | .505 | .20 | 24,000 | 69,450 | 25.0 | 34.0 | .....do | .29*, .21 |
| 6942 | A 59 P S 6 | .505 | .20 | 27,000 | 71,000 | 23.5 | 30.7 | .....do | .27*, .20 |
| 6943 | A 60 P S 6 | .505 | .20 | 34,000 | 77,700 | 23.0 | 34.0 | .....do | .24*, .22 |
| 6944 | A 61 P S 6 | .505 | .20 | 29,000 | 75,900 | 18.0 | 20.5 | .....do | .20*, .16 |
| 6945 | A 62 P S 6 | .505 | .20 | 27,000 | 69,100 | 21.5 | 23.9 | Granular, dull flaky spot at circumference, opened cracks in surface of stem | .20, .23* |
| 6946 | A 63 P S 6 | .505 | .20 | 29,000 | 74,100 | 18.5 | 16.9 | Granular, silky spot at circumference | .12, .15* |
| 6986 | A 64 P S 6 | .505 | .20 | 30,000 | 69,700 | 12.0 | 16.9 | .....do | .13*, .11 |
| 6977 | A 65 P S 6 | .505 | .20 | 32,000 | 71,000 | 19.5 | 20.5 | Silky oblique 30 per cent, granular 70 per cent | .21*, .18 |

## *TABULATION OF STEEL SPECIMENS FROM 6-POUNDER AND 15-POUNDER GUN MOUNTS (STEMS 2″ LONG)*—Continued.

### AXLES, 6-POUNDER GUN MOUNTS, STEEL FORGINGS.

| No. of test. | Marks. | Diameter. | Sectional area. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation in 2 inches. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. |
|---|---|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Per cent.* | *Per cent.* | | ″ ″ |
| 6590 | A 21 A × 6 | .505 | .20 | 27,000 | 62,150 | 28.0 | 43.3 | Silky | .31*, .25 |
| 6767 | A 23 A × 6 | .505 | .20 | 35,000 | 65,300 | 32.5 | 57.2 | Fine silky, cup shaped | .28, .37* |
| 6901 | A 26 A × 6 | .505 | .20 | 30,000 | 61,200 | 31.0 | 49.1 | Silky | .30, .32* |
| 6902 | A 30 A × 6 | .505 | .20 | 33,000 | 64,100 | 32.0 | 49.1 | .....do | .26, .33* |
| 6903 | A 31 A × 6 | .505 | .20 | 31,000 | 65,550 | 30.0 | 46.2 | .....do | .25, .35* |
| 6923 | A 33 A × 6 | .505 | .20 | 24,000 | 59,100 | 34.0 | 57.2 | .....do | .41*, .27 |

### PISTON RODS, 6-POUNDER GUN MOUNTS, STEEL FORGINGS.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 6591 | A 26 PR 6 | .505 | .20 | 35,000 | 85,500 | 22.5 | 30.7 | Silky 60 per cent, granular 40 per cent | .25*, .20 |
| 6592 | A 27 PR 6 | .505 | .20 | 34,000 | 83,150 | 21.5 | 27.4 | Granular 80 per cent, silky 20 per cent | .25*, .18 |
| 6593 | A 41 PR 6 | .505 | .20 | 34,000 | 85,400 | 21.5 | 27.4 | Granular 70 per cent, silky 30 per cent | .22*, .21* |
| 6594 | A 54 PR 6 | .505 | .20 | 34,000 | 82,400 | 22.5 | 30.7 | Dull silky, with granular spot at circumference | .22, .23* |

### PIVOT SOCKETS, 15-POUNDER GUN MOUNTS, STEEL CASTINGS.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 6464 | A 1 2 PS 15 | .505 | .20 | 26,000 | 55,800 | 3.0 | 1.8 | Granular, dull spot at circumference | .04*, .02 |
| 6465 | A 2 2 PS 15 | .505 | .20 | 18,000 | 51,950 | 16.5 | 27.4 | Dull silky, trace of granulation | .14, .19* |
| 6480 | A 27 3 PS 15 | .505 | .20 | 27,000 | 46,300 | 3.0 | 5.7 | Granular 60 per cent, spongy 40 per cent | .05*, .01 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 6481 | A 28 P S 15 | .505 | .20 | 27,000 | 53,200 | 5.5 | 9.5 | Granular 80 per cent, spongy 20 per cent | .04, .07* |
| 6482 | A 30 2 P S 15 | .505 | .20 | 20,000 | 36,400 | 3.0 | Broke at neck. | Granular and silky 50 per cent, seamy 50 per cent | .04, .02 |
| 6532 | A 30 3 P S 15 | .505 | .20 | 22,000 | 49,600 | 6.5 | 13.2 | Amorphous, spongy | .08, .10* |
| 6483 | A 31 P S 15 | .505 | .20 | 27,000 | 45,900 | 3.5 | 5.7 | Granular 70 per cent, seamy 30 per cent | .04, .03* |
| 6632 | A 31 2 P S 15 | .505 | .20 | 32,000 | 74,390 | 13.5 | 15.2 | Granular, radiating from a silky spot in circumference | .12, .15* |
| 6451 | A 33 P S 15 | .505 | .20 | 30,000 | 64,950 | 31.5 | 46.2 | Silky | .27, .36* |
| 6452 | A 34 P S 15 | .505 | .20 | 34,000 | 73,400 | 15.5 | 16.9 | Fine granular 80 per cent, dull silky 20 per cent | .16*, .15 |
| 6484 | A 35 P S 15 | .505 | .20 | 28,000 | 61,450 | 27.0 | 30.7 | Silky | .32*, .20 |
| 6485 | A 36 P S 15 | .505 | .20 | 25,000 | 62,900 | 15.0 | 23.9 | Silky, trace of granulation | .18*, .12 |
| 6486 | A 37 P S 15 | .505 | .20 | 22,000 | 62,000 | 18.0 | 23.9 | Granular 80 per cent, silky 20 per cent | .20*, .16 |
| 6513 | A 38 P S 15 | .505 | .20 | 18,000 | 58,500 | 25.0 | 37.1 | Silky, granular at center | .16, .34* |
| 6487 | A 39 P S 15 | .505 | .20 | 22,000 | 66,000 | 22.5 | 23.9 | Granular, dull spot at circumference | .24*, .21 |
| 6488 | A 40 P S 15 | .505 | .20 | 19,000 | 58,900 | 26.0 | 30.7 | Silky 80 per cent, granular 20 per cent | .20, .32* |
| 6516 | A 40 2 P S 15 | .505 | .20 | 19,000 | 60,400 | 25.0 | 34.0 | Silky | .22, .28* |
| 6645 | A 40 3 P S 15 | .505 | .20 | 26,000 | 48,000 | 6.0 | 9.5 | Dull amorphous, spongy | .09*, .06 |
| 6514 | A 41 P S 15 | .505 | .20 | 29,000 | 65,150 | 22.5 | 30.7 | Dull silky | .23*, .22 |
| 6515 | A 42 P S 15 | .505 | .20 | 20,000 | 60,100 | 18.0 | 20.5 | Granular, dull flaky spot at circumference | .17, .19* |
| 6533 | A 43 P S 15 | .505 | .20 | 32,000 | 68,550 | 22.0 | 27.4 | Dull amorphous, in part granular | .25*, .19 |
| 6570 | A 44 P S 15 | .505 | .20 | 27,000 | 69,550 | 24.5 | 27.4 | Granular 70 per cent, dull silky 30 per cent | .21, .28* |
| 6595 | A 45 P S 15 | .505 | .20 | 23,000 | 62,550 | 25.5 | 30.7 | Dull gray, amorphous | .27*, .24 |
| 6534 | A 46 P S 15 | .505 | .20 | 29,000 | 70,100 | 18.0 | 20.5 | Granular 80 per cent, silky 20 per cent | .15, .21* |
| 6535 | A 47 P S 15 | .505 | .20 | 23,000 | 60,500 | 22.0 | 27.4 | Dull amorphous 70 per cent, granular 30 per cent | .25*, .19 |
| 6571 | A 48 P S 15 | .505 | .20 | 25,000 | 69,450 | 19.5 | 20.5 | Granular, silky spot at circumference | .20*, .19 |
| 6572 | A 49 P S 15 | .505 | .20 | 21,000 | 64,800 | 19.0 | 20.5 | Granular 60 per cent, dull silky 40 per cent | .20*, .18 |
| 6536 | A 50 P S 15 | .505 | .20 | 26,000 | 71,500 | 16.0 | 16.9 | Granular, silky spot at circumference | .15, .17* |
| 6537 | A 51 P S 15 | .505 | .20 | 24,000 | 64,450 | 19.5 | 20.5 | Granular | .17, .22* |

## *TABULATION OF STEEL SPECIMENS FROM 6-POUNDER AND 15-POUNDER GUN MOUNTS (STEMS 8″ LONG)*—Continued.

PIVOT SOCKETS, 15-POUNDER GUN MOUNTS, STEEL CASTINGS—Continued.

| No. of test. | Marks. | Diameter. | Sectional area. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation in 2 inches. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Per cent* | *Per cent.* | | ″ | ″ |
| 6538 | A 52 P S 15 | .505 | .20 | 23,000 | 61,550 | 19.0 | 28.9 | Dull amorphous 80 per cent, granular 20 per cent | .18, | .2 |
| 6539 | A 53 P S 15 | .505 | .20 | 25,000 | 70,050 | 18.5 | 20.5 | Dull amorphous, granular at circumference | .16, | .2 |
| 6540 | A 54 P S 15 | .505 | .20 | 25,000 | 69,550 | 18.0 | 20.5 | Granular 60 per cent, silky 40 per cent | .15, | .2 |
| 6541 | A 55 P S 15 | .505 | .20 | 27,000 | 70,050 | 17.0 | 16.9 | Granular, silky spot at circumference | .16, | .1 |
| 6542 | A 56 P S 15 | .505 | .20 | 25,000 | 73,000 | 15.5 | 16.9 | .....do | .14, | .1 |
| 6683 | A 56 2 P S 15 | .505 | .20 | 35,000 | 72,350 | 20.5 | 20.5 | Granular 60 per cent, silky 40 per cent | .19, | .2 |
| 6543 | A 57 P S 15 | .505 | .20 | 24,000 | 65,400 | 19.0 | 27.4 | Dull amorphous, with granular metal interspersed | .26*, | .1 |
| 6544 | A 58 P S 15 | .505 | .20 | 26,000 | 72,100 | 17.0 | 20.5 | Granular, silky spot at circumference | .19*, | .1 |
| 6545 | A 59 P S 15 | .505 | .20 | 26,000 | 72,000 | 15.5 | 16.9 | .....do | .14, | .1 |
| 6684 | A 59 2 P S 15 | .505 | .20 | 31,000 | 72,050 | 18.5 | 23.9 | Granular 60 per cent, dull silky 40 per cent | .16, | .2 |
| 6546 | A 60 P S 15 | .505 | .20 | 19,000 | 56,000 | 26.0 | 30.7 | Dull amorphous | .29*, | .2 |
| 6685 | A 60 2 P S 15 | .505 | .20 | 20,000 | 55,200 | 28.0 | 40.3 | Dull silky, trace of granulation | .20, | .3 |
| 6547 | A 61 P S 15 | .505 | .20 | 25,000 | 68,800 | 18.0 | 23.9 | Granular 50 per cent, dull amorphous 50 per cent | .16, | .2 |
| 6548 | A 62 P S 15 | .505 | .20 | 23,000 | 69,350 | 19.0 | 20.5 | Granular | .18, | .2 |
| 6549 | A 63 P S 15 | .505 | .20 | 19,000 | 50,900 | 21.0 | 27.4 | Dull amorphous 80 per cent, coarse granular 20 per cent | .29*, | .1 |
| 6686 | A 63 2 P S 15 | .505 | .20 | 19,000 | 51,550 | 25.5 | 37.1 | Dull silky, trace of granulation | .32*, | .1 |
| 6573 | A 64 P S 15 | .505 | .20 | 35,000 | 68,100 | 22.5 | 23.9 | Dull silky | .24*, | .2 |
| 6574 | A 65 P S 15 | .505 | .20 | 25,000 | 65,900 | 21.5 | 27.4 | Granular 20 per cent, dull amorphous 80 per cent | .24*, | .1 |
| 6596 | A 66 P S 15 | .505 | .20 | 35,000 | 67,350 | 21.5 | 23.9 | Gray amorphous | .20, | .2 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 6597 | A 67 P S 15 | .505 | .20 | 33,000 | 69,900 | 20.0 | 23.9 | Gray amorphous 70 per cent, granular 30 per cent | .20*, .20* |
| 6769 | A 68 P S 15 | .505 | .20 | 22,000 | 64,900 | 24.0 | 27.4 | Silky, oblique | .22, .26* |
| 6646 | A 69 P S 15 | .505 | .20 | 27,000 | 54,350 | 34.5 | 49.1 | Silky | .40*, .19 |
| 6900 | A 69 P S 15 | .505 | .20 | 27,000 | 54,050 | 32.0 | 46.2 | .....do | .30, .34* |
| 6647 | A 70 P S 15 | .505 | .20 | 33,000 | 65,600 | 17.5 | 23.9 | Dull amorphous, with trace of granulation | .16*, .19* |
| 6648 | A 71 P S 15 | .505 | .20 | 28,000 | 66,600 | 24.5 | 34.0 | Granular 50 per cent, dull silky 50 per cent | .30*, .19 |
| 6649 | A 72 P S 15 | .505 | .20 | 31,000 | 63,500 | 19.5 | 20.5 | Granular, silky spot at circumference | .20*, .19 |
| 6650 | A 73 P S 15 | .505 | .20 | 21,000 | 70,100 | 18.5 | 23.9 | Silky, trace of granulation | .17, .20* |
| 6770 | A 74 P S 15 | .505 | .20 | 25,000 | 73,600 | 18.0 | 20.5 | Granular 70 per cent, dull silky 30 per cent | .20*, .16 |
| 6771 | A 75 P S 15 | .505 | .20 | 21,000 | 55,600 | 12.5 | 13.2 | Coarse granular, silvery luster | .11, .14* |
| 6797 | A 75 2 P S 15 | .505 | .20 | 19,000 | 55,600 | 15.0 | 16.9 | Coarse granular | .16*, .14 |
| 6772 | A 76 P S 15 | .505 | .20 | 22,000 | 73,400 | 20.5 | 20.5 | Granular | .19, .22* |
| 6773 | A 77 P S 15 | .505 | .20 | 23,000 | 64,100 | 27.5 | 34.0 | Silky 50 per cent, granular 50 per cent | .32*, .23 |
| 6774 | A 78 P S 15 | .505 | .20 | 20,000 | 55,100 | 32.5 | 46.2 | Silky | .23, .42 |
| 6997 | A 78 2 P S 15 | .505 | .20 | 26,000 | 72,100 | 25.0 | 34.0 | Granular 60 per cent, dull silky 40 per cent | .21, .29* |
| 6775 | A 79 P S 15 | .505 | .20 | 17,000 | 49,850 | 35.5 | 57.2 | Silky | .23, .48* |
| 6776 | A 80 P S 15 | .505 | .20 | 19,000 | 59,050 | 27.0 | 37.1 | Silky, trace of granulation | .20, .34* |
| 6873 | A 81 2 P S 15 | .505 | .20 | 38,000 | 74,150 | 19.0 | 27.4 | Dull gray amorphous | .13, .25* |
| 6874 | A 80 P S 15 | .505 | .20 | 27,000 | 74,550 | 20.5 | 27.4 | Granular 60 per cent, dull silky 40 per cent | .18, .23* |
| 6855 | A 82 P S 15 | .505 | .20 | 30,000 | 75,950 | 19.5 | 20.5 | Granular 80 per cent, silky 20 per cent | .21*, .18 |
| 6875 | A 83 P S 15 | .505 | .20 | 24,000 | 71,950 | 17.5 | 20.5 | Dull amorphous, oblique | .20*, .15 |
| 6876 | A 84 P S 15 | .505 | .20 | 26,000 | 74,450 | 17.5 | 20.5 | Granular 60 per cent, silky 40 per cent | .16, .19* |
| 6856 | A 85 P S 16 | .505 | .20 | 29,000 | 77,450 | 13.5 | 16.9 | Granular, silky spot at circumference | .15*, .12 |
| 6857 | A 86 P S 16 | .505 | .20 | 27,000 | 78,600 | 17.5 | 20.5 | .....do | .16, .19* |
| 6858 | A 87 P S 15 | .505 | .20 | 24,000 | 65,500 | 27.0 | 37.1 | Silky | .21, .33* |
| 6877 | A 88 P S 15 | .505 | .20 | 30,000 | 76,200 | 19.0 | 20.5 | Granular, dull silky spot at circumference | .19, .19* |

## *TABULATION OF STEEL SPECIMENS FROM 6-POUNDER AND 15-POUNDER GUN MOUNTS (STEMS 8" LONG)*—Continued.

PIVOT SOCKETS, 15-POUNDER GUN MOUNTS, STEEL CASTINGS—Continued.

| No. of test | ectional area. | Elastic limit per square inch. | Tensile strength per square inch. | | | Appearance of fracture. | Elongation of inch sections. | |
|---|---|---|---|---|---|---|---|---|
| | Sq. inch. | *Pounds.* | *Pounds.* | Per cent. | Per cent. | | " | " |
| 6878 | .20 | 25,000 | 76,000 | 18.0 | 23.9 | Granular | .20* | .16 |
| 6859 | .20 | 28,000 | 75,700 | 20.5 | 23.9 | Granular, dull flaky spot at circumference | .18, | .23 |
| 6860 | .20 | 25,000 | 70,500 | 21.0 | 23.9 | Granular, silky spot a circumference | .22* | .20 |
| 6861 | .20 | 19,000 | 55,400 | 26.5 | 49.1 | Silky | .26, | .38 |
| 6862 | .20 | 17,000 | 51,600 | 36.5 | 51.9 | Dull silky | .30, | .43 |
| 6998 | .20 | 29,000 | 71,100 | 21.0 | 27.4 | Granular, silky spot at circumference | .20, | .22 |
| 6819 | .20 | 24,000 | 64,050 | 27.5 | 37.1 | Silky 70 per cent, granular 30 per cent | .33* | .23 |
| 6863 | .20 | 20,000 | 60,900 | 30.0 | 46.2 | Silky | .21, | .39 |
| 6999 | .20 | 29,000 | 60,500 | 18.5 | 20.5 | Granular 70 per cent, silky 30 per cent | *.13, | .19 |
| 6820 | .20 | 28,000 | 70,100 | 23.0 | 30.7 | Fine granular, silky spot at circumference | .20, | .26 |
| 6821 | .20 | 27,000 | 56,100 | 5.0 | 5.7 | Granular, seam near circumference | .04, | .06 |
| 7186 | .20 | 32,000 | 71,500 | 20.5 | 20.5 | Granular, silky spot at circumference | .20, | .21 |
| 6822 | .20 | 21 000 | 69,500 | 22.5 | 27.4 | Granular 60 per cent, dull silky 40 per cent | .26* | .19 |
| 7166 | .20 | 31,000 | 63,400 | 22.5 | 30.7 | Silky | .27* | .18 |
| 6850 | .20 | 21,000 | 62,550 | 19.0 | 20.5 | Granular, flaky spot at circumference | .20* | .18 |
| 7000 | .20 | 28,000 | 66,450 | 27.0 | 34.0 | Dully silky, oblique | .24, | .30 |
| 6832 | .20 | 23,000 | 69,400 | 28.0 | 27.4 | Granular 80 per cent, silky 20 per cent | .20, | .26 |
| 6864 | .20 | 21,000 | 65,550 | 28.5 | 40.8 | Dull silky, oblique | .22, | .35 |
| 7001 | .20 | 29,000 | 75,500 | 14.0 | 13.2 | Granular, silky spot at circumference | .15* | .13 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 6865 | A 103 P S 15 | .505 | .20 | 20,000 | 65,250 | 26.0 | 37.1 | Granular 60 per cent, silky 40 per cent | .18, .34* |
| 7002 | A 108 2 P S 15 | .505 | .20 | 24,000 | 69,800 | 27.0 | 34.0 | Granular 60 per cent, silky flaky 40 per cent | .23, .31* |
| 6866 | A 104 P S 15 | .505 | .20 | 24,000 | 66,900 | 23.0 | 23.9 | Granular | .22, .24* |
| 6867 | A 105 P S 15 | .505 | .20 | 20,000 | 65,500 | 25.0 | 34.0 | Silky, granular center | .22, .28* |
| 6879 | A 106 P S 15 | .505 | .20 | 28,000 | 72,600 | 23.5 | 34.0 | Granular 60 per cent, silky 40 per cent | .26*, .21 |
| 6880 | A 107 P S 15 | .505 | .20 | 25,000 | 69,500 | 22.5 | 27.4 | Granular, silky spot at circumference | .25*, .20 |
| 6881 | A 108 P S 15 | .505 | .20 | 25,000 | 72,950 | 22.5 | 27.4 | Granular | .19, .26* |
| 6882 | A 109 P S 15 | .505 | .20 | 28,000 | 70,900 | 25.0 | 27.4 | Granular 60 per cent, silky 40 per cent | .25*, .25* |
| 6883 | A 110 P S 15 | .505 | .20 | 27,000 | 66,500 | 25.0 | 30.7 | Granular 70 per cent, silky 30 per cent | .29*, .21 |
| 6884 | A 111 P S 15 | .505 | .20 | 35,000 | 82,000 | 19.0 | 20.5 | Granular | .17, .21 |
| 6949 | A 112 P S 15 | .505 | .20 | 26,000 | 72,900 | 22.0 | 27.4 | Granular, silky spot at circumference | .23*, .21 |
| 7003 | A 112 P S 15 | .505 | .20 | 24,000 | 73,450 | 15.0 | 16.9 | Granular 80 per cent, silky 20 per cent | .13, .17* |
| 6971 | A 113 P S 15 | .505 | .20 | 28,000 | 65,350 | 18.0 | 16.9 | Granular, dull silky spot at circumference | .18*, .18 |
| 6966 | A 114 P S 15 | .505 | .20 | 28,000 | 68,450 | 11.5 | 13.2 | .....do | .11, .12* |
| 6967 | A 115 P S 15 | .505 | .20 | 24,000 | 68,900 | 25.0 | 30.7 | Granular 70 per cent, dull silky 30 per cent | .27*, .23 |
| 6968 | A 116 P S 15 | .505 | .20 | 28,000 | 72,500 | 19.5 | 20.5 | Granular, silky spot at circumference | .20*, .19 |
| 6972 | A 117 P S 15 | .505 | .20 | 32,000 | 77,600 | 23.5 | 27.4 | .....do | .24*, .23 |
| 6969 | A 118 P S 15 | .505 | .20 | 29,000 | 78,550 | 9.5 | 13.2 | .....do | .10*, .09 |
| 7187 | A 118 2 P S 15 | .505 | .20 | 24,000 | 68,950 | 13.5 | 16.9 | .....do | .15*, .12 |
| 7012 | A 119 P S 15 | .505 | .20 | 30,000 | 71,450 | 15.0 | 16.9 | Granular, dull spot at circumference | .15*, .15 |
| 7188 | A 119 2 P S 15 | .505 | .20 | 30,000 | 71,450 | 21.5 | 23.9 | Granular 90 per cent, silky 10 per cent | .21, .22* |
| 7025 | A 120 P S 15 | .505 | .20 | 30,000 | 68,400 | 20.0 | 20.5 | Granular 80 per cent, silky 20 per cent | .22*, .18 |
| 7013 | A 121 P S 15 | .505 | .20 | 26,000 | 72,900 | 20.0 | 23.9 | Granular, dull spot at circumference | .26*, .14 |
| 7014 | A 122 P S 15 | .505 | .20 | 30,000 | 74,000 | 20.0 | 23.9 | Granular 80 per cent, silky 20 per cent | .22*, .18 |
| 7015 | A 124 P S 15 | .505 | .20 | 29,000 | 66,900 | 19.5 | 20.5 | Granular 75 per cent, dull silky 25 per cent | ..... |

[1] Approximate.

## *TABULATION OF STEEL SPECIMENS FROM 6-POUNDER AND 15-POUNDER GUN MOUNTS (STEMS 2″ LONG)*—Continued.

PIVOT SOCKETS, 15-POUNDER GUN MOUNTS, STEEL CASTINGS—Continued.

| No. of test. | Marks. | Diameter. | Sectional area. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation in 2 inches. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. |
|---|---|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Per cent.* | *Per cent.* | | ″ ″ |
| 7016 | A 125 P S 15 | .505 | .20 | 29,000 | 62,350 | 10.0 | 13.2 | Granular 90 per cent, dull silky 10 per cent | .10*, .10 |
| 7026 | A 126 P S 15 | .505 | .20 | 30,000 | 65,100 | 15.0 | 13.2 | Granular 60 per cent, silky 40 per cent | .14, .16* |
| 7017 | A 127 P S 15 | .505 | .20 | 32,000 | 81,500 | 14.5 | 16.9 | Granular, dull spot at circumference | .14, .15* |
| 7136 | A 128 P S 15 | .505 | .20 | 22,000 | 62,400 | 16.5 | 16.9 | Granular, silky spot at circumference | .16, .17* |
| 7189 | A 128 2 P S 15 | .505 | .20 | 32,000 | 71,500 | 16.0 | 16.9 | Granular 80 per cent, silky 20 per cent | .17*, .15 |
| 7126 | A 129 P S 15 | .505 | .20 | 27,000 | 70,500 | 17.5 | 20.5 | Granular 90 per cent, silky 10 per cent | .16, .19* |
| 7127 | A 130 P S 15 | .505 | .20 | 29,000 | 69,900 | 16.0 | 16.9 | Granular 60 per cent, silky 40 per cent | .15, .17* |
| 7128 | A 131 P S 15 | .505 | .20 | 32,000 | 71,450 | 14.5 | 16.9 | Granular, silky spot at circumference | .13, .16* |
| 7129 | A 132 P S 15 | .505 | .20 | 25,000 | 69,500 | 16.0 | 16.9 | Granular | .18*, .14 |
| 7137 | A 133 P S 15 | .505 | .20 | 21,000 | 67,450 | 11.0 | 13.2 | ....do | .11, .11* |
| 7150 | A 134 P S 15 | .505 | .20 | 29,000 | 65,100 | 14.5 | 13.2 | Dull gray amorphous, trace of crystallization | .16*, .13 |
| 7138 | A 136 P S 15 | .505 | .20 | 32,000 | 71,500 | 18.0 | 16.9 | Granular, silky spot at circumference | .18*, .18 |
| 7167 | A 139 P S 15 | .505 | .20 | 33,000 | 73,000 | 18.5 | 20.5 | .....do | .16, .21* |
| 7156 | A 140 P S 15 | .505 | .20 | 21,000 | 61,950 | 10.0 | 13.2 | Granular, intermingled with silky metal | .09, .11* |
| 7157 | A 141 P S 15 | .505 | .20 | 26,000 | 64,850 | 9.5 | 9.5 | Granular, silky spot at circumference | .09, .10* |
| 7151 | A 142 P S 15 | .505 | .20 | 31,000 | 72,300 | 21.5 | 20.5 | .....do | .26*, .17 |
| 7158 | A 143 P S 15 | .505 | .20 | 27,000 | 68,000 | 19.0 | 16.9 | .....do | .19, .19* |
| 7139 | A 144 P S 15 | .505 | .20 | 20,000 | 60,400 | 11.0 | 13.2 | .....do | .11, .11* |
| 7140 | A 145 P S 15 | .505 | .20 | 21,000 | 64,000 | 17.0 | 20.5 | Granular | .18, .16* |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7141 | A 146 P S 15 | .505 | .20 | 31,000 | 69,500 | 19.5 | 20.5 | Granular, silky spot at circumference | .19, .20* |
| 7142 | A 147 P S 15 | .505 | .20 | 28,000 | 66,900 | 15.5 | 20.5 | .....do | .15, .16* |
| 7159 | A 148 P S 15 | .505 | .20 | 30,000 | 70,900 | 16.5 | 16.9 | Granular 60 per cent, silky 40 per cent | .15, .18* |
| 7152 | A 149 P S 15 | .505 | .20 | 28,000 | 68,350 | 18.0 | 16.9 | Granular, with irregular section of silky metal across surface | .16, .20* |
| 7184 | A 150 P S 15 | .505 | .20 | [1]24,000 | 64,900 | 11.0 | 13.2 | Granular, silky spot at circumference | .10, .12* |
| 7185 | A 151 P S 15 | .505 | .20 | 23,000 | 53,950 | 3.5 | 5.7 | Granular, silvery luster 60 per cent, silky flaky 40 per cent | .03, .04* |

PIVOT YOKES, 15-POUNDER GUN MOUNTS, STEEL CASTINGS.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 6613 | S 1 P Y 15 | .505 | .20 | 28,000 | 59,100 | 13.0 | 20.5 | Dull gray, amorphous | .12, .14* |
| 6765 | S 4 P Y 15 | .505 | .20 | 25,000 | 75,100 | 19.5 | 27.4 | Granular 60 per cent, silky 40 per cent | .24*, .15 |
| 6779 | S 5 P Y 15 | .505 | .20 | 33,000 | 77,100 | 19.5 | 23.9 | Granular, silky spot at circumference | .18, .21* |
| 6796 | S 6 P Y 15 | .505 | .20 | 30,000 | 72,800 | 23.5 | 27.4 | Granular 80 per cent, silky 20 per cent | .21, .26* |
| 6815 | S 7 P Y 15 | .505 | .20 | 20,000 | 65,000 | 16.5 | 16.9 | Granular | .17*, .16 |
| 6848 | S 7 2 P Y 15 | .505 | .20 | 27,000 | 70,550 | 22.5 | 30.7 | Granular 60 per cent, silky 40 per cent | .25*, .20 |
| 6616 | S 8 2 P Y 15 | .505 | .20 | 33,000 | 72,000 | 26.5 | 34.0 | Fine granular, silky spot at circumference | .28*, .25 |
| 6817 | S 9 P Y 15 | .505 | .20 | 28,000 | 69,600 | 23.0 | 23.9 | .....do | .23, .23* |
| 6818 | S 10 P Y 15 | .505 | .20 | 27,000 | 71,000 | 21.5 | 27.4 | Granular, silky spot at circumference | .19, .24* |
| 6883 | S 11 P Y 15 | .505 | .20 | 28,000 | 72,500 | 20.0 | 23.9 | .....do | .22, .18 |
| 6834 | S 12 P Y 15 | .505 | .20 | 29,000 | 71,550 | 18.0 | 27.4 | .....do | .23*, .13 |
| 6868 | S 15 P Y 15 | .505 | .20 | 33,000 | 71,500 | 18.0 | 20.5 | Fine granular, silky spot at circumference | .19*, .17 |
| 6887 | S 16 P Y 15 | .505 | .20 | 32,000 | 71,000 | 19.5 | 20.5 | Granular 60 per cent, silky 40 per cent | .18, .21* |
| 6888 | S 17 P Y 15 | .505 | .20 | 20,000 | 62,400 | 16.5 | 16.9 | Granular | .16, .17* |
| 6907 | S 17 2 P Y 15 | .505 | .20 | 32,000 | 69,450 | 10.0 | 9.5 | Granular, silky spot at circumference | .10, .10* |
| 6920 | S 17 3 P Y 15 | .505 | .20 | 31,000 | 74,000 | 25.0 | 34.0 | Granular 60 per cent, silky 40 per cent | .28*, .22 |

[1]Approximate.

## *TABULATION OF STEEL SPECIMENS FROM 6-POUNDER AND 15-POUNDER GUN MOUNTS (STEMS 2″ LONG)*—Continued.

PIVOT YOKES, 15-POUNDER GUN MOUNTS, STEEL CASTINGS—Continued.

| No. of test. | | | | | | Elongation in 2 inches. | | | Elongation of inch sections. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Per cent.* | | | ″ | ″ |
| 6890 | S 18 P Y 15 | .505 | .20 | 26,000 | 66,000 | 11.0 | | | .10, | .12* |
| 6904 | S 18 2 P Y 15 | .505 | .20 | 34,000 | 76,800 | 24.5 | | | .23, | .26* |
| 6889 | S 19 2 P Y 15 | .505 | .20 | 34,000 | 77,000 | 22.5 | 23.9 | Granular 70 per cent, silky 30 per cent | .20, | .25* |
| 6891 | S 20 P Y 15 | .505 | .20 | 32,000 | 79,100 | 20.0 | 23.9 | Granular, silky spot at circumference | .17, | .23* |
| 6892 | S 21 P Y 15 | .506 | .20 | 31,000 | 73,050 | 25.5 | 34.0 | Silky 70 per cent, granular 30 per cent | .30*, | .21 |
| 6893 | S 22 P Y 15 | .505 | .20 | 34,000 | 75,400 | 24.0 | 34.0 | .....do | .21, | .27* |
| 6894 | S 23 P Y 15 | .505 | .20 | 31,000 | 73,600 | 25.0 | 30.7 | Silky 60 per cent, granular 40 per cent | .20, | .35* |
| 6905 | S 24 P Y 15 | .505 | .20 | 33,000 | 72,500 | 26.5 | 34.0 | Granular 55 per cent, silky 45 per cent | .28*, | .25 |
| 6906 | S 25 P Y 15 | .505 | .20 | 32,000 | 73,550 | 21.5 | 27.4 | Granular | .19, | .24* |
| 6914 | S 26 P Y 15 | .506 | .20 | 30,000 | 77,000 | 22.5 | 30.7 | Granular, silky spot at circumference | .24*, | .21 |
| 6919 | S 27 P Y 15 | .505 | .20 | 31,000 | 75,600 | 20.0 | 23.9 | .....do | .21*, | .19 |
| 6915 | S 28 P Y 15 | .505 | .20 | 30,000 | 77,600 | 21.0 | 23.9 | .....do | .20, | .22* |
| 6921 | S 29 P Y 15 | .505 | .20 | 30,000 | 73,600 | 21.0 | 27.4 | .....do | .19, | .23* |
| 6925 | S 30 P Y 15 | .505 | .20 | 32,000 | 76,550 | 20.5 | 23.9 | Granular, silky spot | .19, | .22* |
| 6927 | S 31 P Y 15 | .505 | .20 | 37,000 | 87,100 | 19.5 | 23.9 | Fine granular | .22*, | .17 |
| 6928 | S 32 P Y 15 | .505 | .20 | 29,000 | 70,300 | 17.5 | 20.5 | Granular, silvery luster | .19*, | .16 |
| 6929 | S 33 P Y 15 | .505 | .20 | 30,000 | 79,500 | 17.5 | 20.5 | Granular, silky spot at circumference | .19*, | .16 |
| 6930 | S 34 P Y 15 | .505 | .20 | 30,000 | 76,450 | 19.0 | 23.9 | .....do | .17, | .21* |
| 6931 | S 35 P Y 15 | .505 | .20 | 27,000 | 64,000 | 10.5 | 13.2 | Granular 80 per cent, silky 20 per cent | .10, | .11* |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 6964 | S 35 2 P Y 15 | .505 | .20 | 29,000 | 77,400 | 19.0 | 20.5 | Granular, silky spot at circumference | .21*, .17 |
| 6978 | S 35 3 P Y 15 | .505 | .20 | 38,000 | 88,600 | 14.0 | 13.2 | Fine granular | .16*, .12 |
| 6947 | S 36 P Y 15 | .505 | .20 | 28,000 | 73,100 | 18.0 | 20.5 | Granular, silky spot at circumference | .19*, .17 |
| 6965 | S 38 P Y 15 | .505 | .20 | 31,000 | 73,500 | 19.0 | 20.5 | .....do | .20*, .18 |
| 6950 | S 40 P Y 15 | .505 | .20 | 30,000 | 67,250 | 18.5 | 20.5 | .....do | .20*, .17 |
| 6951 | S 42 P Y 15 | .505 | .20 | 30,000 | 67,900 | 15.5 | 16.9 | Granular 60 per cent, silky 40 per cent | .14, .17* |
| 6952 | S 43 P Y 15 | .505 | .20 | 30,000 | 73,900 | 18.5 | 20.5 | Granular 70 per cent, silky 30 per cent | .18, .19* |
| 6973 | S 45 P Y 15 | .505 | .20 | 35,000 | 69,550 | 5.5 | 9.5 | Granular, cavity ".08 diameter at circumference | .05, .06* |
| 6993 | S 45 P Y 15 | .505 | .20 | 35,000 | 85,600 | 18.5 | 20.5 | Granular, silky spot at circumference | .20*, .17 |
| 6983 | S 47 P Y 15 | .505 | .20 | 33,000 | 76,550 | 7.0 | 9.5 | .....do | .06, .08* |
| 6992 | S 47 2 P Y 15 | .505 | .20 | 38,000 | 71,000 | 12.0 | 13.2 | .....do | .11, .13* |
| 7020 | S 47 3 P Y 15 | .505 | .20 | 36,000 | 79,900 | 16.0 | 16.9 | .....do | .16, .16* |
| 6984 | S 49 P Y 15 | .505 | .20 | 36,000 | 78,500 | 9.0 | 9.5 | .....do | .10*, .08 |
| 6994 | S 49 2 P Y 15 | .505 | .20 | 25,000 | 69,100 | 23.5 | 27.4 | .....do | .25*, .22 |
| 6988 | S 53 P Y 15 | .505 | .20 | 36,000 | 85,600 | 12.5 | 13.2 | .....do | .11, .14* |
| 7006 | S 53 2 P Y 15 | .505 | .20 | 32,000 | 74,050 | 21.0 | 23.9 | Granular, silky, oblique spot near circumference. Opened cracks in stem | .20, .22* |
| 6989 | S 55 P Y 15 | .505 | .20 | 39,000 | 75,100 | 6.5 | 9.5 | Granular, dull, silky spot at circumference | .06, .07* |
| 7007 | S 55 P Y 15 | .505 | .20 | 30,000 | 68,000 | 22.5 | 27.4 | Granular 60 per cent, silky 40 per cent | .20, .25* |
| 6991 | S 56 P Y 15 | .505 | .20 | 38,000 | 83,100 | 15.0 | 20.5 | .....do | .17*, .13 |
| 6990 | S 57 P Y 15 | .505 | .20 | 37,000 | 79,000 | 15.0 | 16.9 | Granular 80 per cent, silky 20 per cent | .14, .16* |
| 7008 | S 62 P Y 15 | .505 | .20 | 39,000 | 96,700 | 15.0 | 16.9 | Granular, silky spot at circumference | .16*, .14 |
| 7083 | S 62 2 P Y 15 | .505 | .20 | 29,000 | 71,100 | 16.5 | 20.5 | .....do | .18*, .15 |
| 7009 | S 63 P Y 15 | .505 | .20 | 32,000 | 66,500 | 24.5 | 27.4 | Silky, 50 per cent of surface interspersed with fine granulation | .23, .26* |
| 7018 | S 65 P Y 15 | .505 | .20 | 31,000 | 70,000 | 10.0 | 13.2 | Granular, dull spot at circumference | .10, .10* |
| 7122 | S 65 2 P Y I5 | .505 | .20 | 29,000 | 69,900 | 21.0 | 20.5 | Granular, silky spot at circumference | .22*, .20 |
| 7021 | S 66 P Y 15 | .505 | .20 | 33,000 | 72,050 | 17.5 | 16.9 | .....do | .18*, .17 |

## *TABULATION OF STEEL SPECIMENS FROM 6-POUNDER AND 15-POUNDER GUN MOUNTS (STEMS 2″ LONG)*—Continued.

### PIVOT YOKES, 15-POUNDER GUN MOUNTS, STEEL CASTINGS—Continued.

| No. of test. | Marks. | Diameter. | Sectional area. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation in 2 inches. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Per cent.* | *Per cent.* | | *″* | *″* |
| 7019 | S 67 P Y 15 | .505 | .20 | 28,000 | 69,900 | 14.0 | 16.9 | Granular, dull spot at circumference | .13, | .15* |
| 7123 | S 67 2 P Y 15 | .505 | .20 | 30,000 | 68,950 | 12.0 | 13.2 | Granular, silky spot at circumference | .10, | .14* |
| 7194 | S 67 3 P Y 15 | .505 | .20 | 23,000 | 66,450 | 17.5 | 20.5 | Granular, silvery luster, silky spot at circumference | .16, | .19* |
| 7022 | S 69 P Y 15 | .505 | .20 | 31,000 | 71,600 | 21.0 | 20.5 | Granular 60 per cent, dull silky 40 per cent | .24*, | .18 |
| 7023 | S 70 P Y 15 | .505 | .20 | 24,000 | 61,800 | 16.5 | 20.5 | Silky, interspersed with granular metal | .19*, | .14 |
| 7084 | S 71 P Y 15 | .505 | .20 | 33,000 | 73,400 | 13.0 | 16.9 | Granular, silky spot at circumference | .12, | .14* |
| 7168 | S 71 2 P Y 15 | .505 | .20 | 35,000 | 75,950 | 19.0 | 20.5 | .....do | .19*, | .19 |
| 7077 | S 73 P Y 15 | .505 | .20 | 31,000 | 71,700 | 12.5 | 13.2 | .....do | .11, | .14* |
| 7169 | S 73 2 P Y 15 | .505 | .20 | 25,000 | 70,950 | 21.5 | 20.5 | Granular 50 per cent, silky 50 per cent | .23*, | .20 |
| 7085 | S 74 P Y 15 | .505 | .20 | 29,000 | 65,100 | 9.5 | 13.2 | Granular, silky spot at circumference. Opened cracks along the stem | .09, | .10* |
| 7174 | S 74 2 P Y 15 | .505 | .20 | 29,000 | 67,000 | 23.5 | 27.4 | Granular, silky spot at circumference | .21, | .26* |
| 7078 | S 75 P Y 15 | .505 | .20 | 31,000 | 73,050 | 10.0 | 13.2 | .....do | .09, | .11* |
| 7165 | S 75 P Y 15 | .505 | .20 | 31,000 | 69,000 | 16.0 | 16.9 | Granular 75 per cent, silky 25 per cent | .15, | .17* |
| 7086 | S 76 P Y 15 | .505 | .20 | 32,000 | 74,650 | 16.5 | 20.5 | Granular 70 per cent, silky 30 per cent | .15, | .18* |
| 7087 | S 77 P Y 15 | .505 | .20 | 32,000 | 72,050 | 12.0 | 16.9 | Silky 60 per cent, granular 40 per cent | .13*, | .11 |
| 7175 | S 77 2 P Y 15 | .505 | .20 | 32,000 | 72,500 | 18.0 | 20.5 | Silky 85 per cent, granular 15 per cent | .18, | .18* |
| 7176 | S 77 2 P Y 15 | .505 | .20 | 24,000 | 64,800 | 25.0 | 30.7 | Silky | .20, | .30* |
| 7160 | S 78 P Y 15 | .505 | .20 | 28,000 | 68,900 | 10.0 | 16.9 | Granular 60 per cent, dull silky 40 per cent | .11*, | .09 |
| 7195 | S 78 2 P Y 15 | .505 | .20 | 27,000 | 66,500 | 23.5 | 27.4 | Granular 50 per cent, silky 50 per cent | .19, | .28* |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7124 | S 79<br>P Y 15 | .505 | .20 | 30,000 | 66,500 | 10.0 | 13.2 | Granular, silky spot at circumference, with cavity | .10*, .10 |
| 7125 | S 80<br>P Y 15 | .505 | .20 | [1]29,000 | 66,400 | 6.5 | 9.5 | Granular 80 per cent, silky 20 per cent | .07*, .06 |
| 7177 | S 80<br>2 P Y 15 | .505 | .20 | 28,000 | 70,500 | 21.0 | 23.9 | Granular, silky spot at circumference | .22*, .20 |
| 7161 | S 83<br>P Y 15 | .505 | .20 | 27,000 | 69,950 | 16.5 | 49.1 | .....do | .17*, .16 |
| 7147 | S 84<br>P Y 15 | .505 | .20 | 28,000 | 69,450 | 12.0 | 13.2 | Granular 80 per cent, silky 20 per cent | .11, .13* |
| 7178 | S 86<br>P Y 15 | .505 | .20 | 31,000 | 70,400 | 12.0 | 13.2 | Granular, silky spot at circumference | .11, .13* |
| 7196 | S 86<br>2 P Y 15 | .505 | .20 | 24,000 | 66,400 | 19.5 | 23.9 | Granular 60 per cent, silky 40 per cent | .22*. .17 |
| 7204 | S 88<br>P Y 15 | .505 | .20 | 30,000 | 63,900 | 7.5 | 9.5 | Granular 85 per cent, silky 15 per cent | .07, .08* |
| 7197 | S 90<br>P Y 15 | .505 | .20 | 31,000 | 65,850 | 9.5 | 13.2 | Dull silky 90 per cent, granular 10 per cent | .12*. .07 |
| 7198 | S 91<br>P Y 15 | .505 | .20 | 31,000 | 69,500 | 14.5 | 16.9 | Granular, silky spot at circumference | .15*, .14 |
| 7199 | S 93<br>P Y 15 | .505 | .20 | 30,000 | 72,500 | 16.5 | 16.9 | Granular 85 per cent, silky 15 per cent | .17, .16* |
| 7200 | S 94<br>P Y 15 | .505 | .20 | 31,000 | 73,900 | 15.0 | 16.9 | Granular 90 per cent, silky 10 per cent | .15*, 15 |

INNER BASES 15-POUNDER GUN MOUNTS, STEEL CASTINGS.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 6447 | A 26<br>I B 15 | .505 | .20 | 32,000 | 64,050 | 29.0 | 46.2 | Silky | .25, .33* |
| 6446 | A 27<br>I B 15 | .505 | .20 | 25,000 | 51,600 | 6.5 | 9.5 | Granular, spongy spot at circumference | .05, .08* |
| 6448 | A 29<br>I B 15 | .505 | .20 | 29,000 | 67,050 | 21.5 | 30.7 | Dull amorphous | .21, .22* |
| 6976 | A 29<br>3 I B 15 | .505 | .20 | 28,000 | 74,100 | 21.0 | 20.5 | Dull silky 60 per cent, granular 40 per cent | .22*, .20 |
| 6449 | A 30<br>I B 15 | .505 | .20 | 33,000 | 66,950 | 23.5 | 30.7 | Silky | .29*, .18 |
| 6450 | A 31<br>I B 15 | .505 | .20 | 21,000 | 52,850 | 35.5 | 59.8 | .....do | .45*. .26 |
| 6475 | A 31<br>2 I B 15 | .505 | .20 | 24,000 | 52,450 | 37.5 | 64.6 | .....do | .52*, .23 |
| 6517 | A 31<br>3 I B 15 | .505 | .20 | 19,000 | 48,550 | 18.5 | 34.0 | Dull amorphous, spongy | .13, .24* |
| 6476 | A 32<br>I B 15 | .505 | .20 | 23,000 | 63,900 | 23.5 | 34.0 | Granular 70 per cent, silky 30 per cent | .20, .27* |
| 6477 | A 33<br>I B 15 | .505 | .20 | 22,000 | 62,450 | 23.0 | 34.0 | Granular 60 per cent, silky 40 per cent | .18, .28* |

[1] Approximate.

## *TABULATION OF STEEL SPECIMENS FROM 6-POUNDER AND 15-POUNDER GUN MOUNTS (STEMS 8″ LONG)*—Continued.

INNER BASES, 15-POUNDER GUN MOUNTS, STEEL CASTINGS—Continued.

| No. of test. | Marks. | Diameter | Sections area. | | Tensile strength per square inch. | Elongation in 2 inches. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Per cent.* | *Per cent.* | | ″ | ″ |
| 6478 | A 34 I B 15 | .505 | .20 | 22,000 | 62,950 | 24.5 | 27.4 | Granular, dull spot at circumference | .21, | .29* |
| 6479 | A 35 I B 15 | .505 | .20 | 22,000 | 64,450 | 21.0 | 23.9 | Granular 90 per cent, silky 10 per cent | .22*, | .20 |
| 6737 | A 36 I B 15 | .505 | .20 | 30,000 | 70,500 | 22.0 | 27.4 | Granular, dull silky spot at circumference | .25*, | 19 |
| 6738 | A 37 I B 15 | .505 | .20 | 25,000 | 62,600 | 29.0 | 37.1 | Silky | .26, | .32* |
| 6739 | A 38 I B 15 | .505 | .20 | 30,000 | 67,500 | 25.0 | 30.7 | Silky, trace of granulation | .23, | .27* |
| 6740 | A 39 I B 15 | .505 | .20 | 19,000 | 57,500 | 26.5 | 30.7 | Granular 60 per cent, dull amorphous 40 per cent | .31*, | .22 |
| 6922 | A 39 2 I B 15 | .505 | .20 | 47,000 | 70,500 | 16.0 | 20.5 | Dull gray, amorphous | .17*, | .15 |
| 6802 | A 40 I B 15 | .505 | .20 | 24,000 | 64,350 | 20.5 | 23.9 | Granular | .18, | .23* |
| 6849 | A 41 I B 15 | .505 | .20 | 29,000 | 69,050 | 18.0 | 20.5 | Granular 55 per cent, dull silky 45 per cent | .16, | .20* |
| 6741 | A 42 I B 15 | .505 | .20 | 22,000 | 66,200 | 20.5 | 27.4 | Granular 50 per cent, dull amorphous 50 per cent | .17, | .27* |
| 6687 | A 43 I B 15 | .505 | .20 | 24,000 | 66,700 | 18.0 | 20.5 | Granular 60 per cent, dull amorphous 40 per cent | .19*, | .17 |
| 6717 | A 43 I B 15 | .505 | .20 | 27,000 | 67,900 | 16.5 | 16.9 | Granular 60 per cent, dull silky 40 per cent | .18*, | .15 |
| 6788 | A 44 I B 15 | .505 | .20 | 28,000 | 72,600 | 18.5 | 20.5 | Dull amorphous 20 per cent, granular 80 per cent | .22*, | .15 |
| 6689 | A 45 I B 15 | .505 | .20 | 30,000 | 66,000 | 15.0 | 16.9 | Dull amorphous, trace of granulation | .17*, | .13 |
| 6718 | A 45 I B 15 | .505 | .20 | 33,000 | 65,600 | 15.3 | 23.9 | Dull amorphous | .20, | .23* |
| 6780 | A 46 I B 15 | .505 | .20 | 33,000 | 65,600 | 23.0 | 27.4 | Silky | .25*, | .21 |
| 6742 | A 47 I B 15 | .505 | .20 | 25,000 | 60,100 | 39.5 | 66.9 | Silky, cup shaped | .23, | .51* |
| 6786 | A 47 I B 15 | .505 | .20 | 25,000 | 49,100 | 41.0 | 69.2 | .....do | .52*, | .30 |
| 6980 | A 47 2 I B 15 | .505 | .20 | 28,000 | 70,050 | 23.0 | 27.4 | Granular, silky spot at circumference | .25*, | .21 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 6803 | A 48 / I B 15 | .505 | .20 | 29,000 | 79,150 | 19.0 | 23.9 | Granular | .17, .21* |
| 6823 | A 49 / I B 15 | .505 | .20 | 19,000 | 51,500 | 36.5 | 59.8 | Dull silky | .25. .48* |
| 6981 | A 49 / 2 I B 15 | .505 | .20 | 20,000 | 60,800 | 23.0 | 30.7 | Dull amorphous, trace of granulation | .18, .28* |
| 7088 | A 49 / 3 I B 15 | .505 | .20 | 28,000 | 84,000 | 16.0 | 16.9 | Granular, silky spot at circumference | .14, .18* |
| 6824 | A 50 / I B 15 | .505 | .20 | 15,000 | 51,550 | 36.5 | 54.6 | Silky, trace of granulation | .43*, .30 |
| 7004 | A 50 / 2 I B 15 | .505 | .20 | 33,000 | 83,450 | 20.5 | 20.5 | Granular, silky spot at circumference | .23*, .18 |
| 6825 | A 51 / I B 15 | .505 | .20 | 34,000 | 73,950 | 22.5 | 23.9 | .....do | .28*, .22 |
| 6826 | A 52 / I B 15 | .505 | .20 | 26,000 | 68,500 | 22.5 | 20.5 | .....do | .20, .25* |
| 6827 | A 53 / I B 15 | .505 | .20 | 32,000 | 69,050 | 30.0 | 40.3 | Silky, trace of granulation | .26, .34* |
| 6828 | A 54 / I B 15 | .505 | .20 | 17,000 | 54,600 | 34.0 | 49.1 | .....do | .39*, .29 |
| 6982 | A 54 / I B 15 | .505 | .20 | 29,000 | 69,050 | 20.0 | 23.9 | Granular, silky spot at circumference | .21*, .19 |
| 6829 | A 55 / I B 15 | .505 | .20 | 29,000 | 66,050 | 26.5 | 30.7 | Granular 60 per cent, silky 40 per cent | .33*, .20 |
| 6830 | A 56 / I B 15 | .505 | .20 | 24,000 | 63,900 | 15.0 | 16.9 | Granular, silky spot at circumference | .17*, .13 |
| 6926 | A 56 / 2 I B 15 | .505 | .20 | 33,000 | 68,200 | 27.5 | 34.0 | Granular 30 per cent, dull gray amorphous 70 per cent | .25, .30* |
| 6979 | A 56 / 2 I B 15 | .505 | .25 | 31,000 | 74,200 | 19.0 | 20.5 | Granular, silky spot at circumference | .17, .21* |
| 6831 | A 57 / I B 15 | .505 | .20 | 22,000 | 63,450 | 27.5 | 30.7 | Granular 80 per cent, silky 20 per cent | .23, .32* |
| 7011 | A 57 / 2 I B 15 | .505 | .20 | 24,000 | 71,500 | 18.5 | 23.9 | Granular, silky spot at circumference | .18, .19* |
| 6908 | A 58 / I B 15 | .505 | .20 | 29,000 | 70,600 | 9.5 | 5.7 | Granular, dull flaky spot at circumference | .10*, .09 |
| 6932 | A 58 / 2 I B 15 | .505 | .20 | 29,000 | 72,500 | 20.0 | 20.5 | Granular, silky spot at circumference | .22*, .18 |
| 6909 | A 59 / I B 15 | .505 | .20 | 23,000 | 55,200 | 7.5 | 9.5 | Coarse granular and flaky metal | .10*, .05 |
| 6933 | A 59 / 2 I B 15 | .505 | .20 | 30,000 | 67,050 | 25.0 | 30.7 | Dull silky, trace of granulation | .28*, .22 |
| 6910 | A 60 / I B 15 | .505 | .20 | 30,000 | 67,550 | 10.0 | 13.2 | Granular, silky spot at circumference | .13*, .07 |
| 6934 | A 60 / 2 I B 15 | .505 | .20 | ..... | 19,500 | 2.0 | ..... | Dull gray amorphous 10 per cent, dark serrated 90 per cent | .02*, .02* |
| 6911 | A 61 / I B 15 | .505 | .20 | 33,000 | 73,000 | 21.0 | 27.4 | Granular, silky spot at circumference | .19, .23* |
| 6912 | A 62 / I B 15 | .505 | .20 | 24,000 | 67,900 | 25.0 | 37.1 | Silky 50 per cent, granular 50 per cent | .18, .32* |
| 6913 | A 63 / I B 15 | .505 | .20 | 29,000 | 69,750 | 22.5 | 27.4 | Silky, oblique | .27*, .18 |

## *TABULATION OF STEEL SPECIMENS FROM 6-POUNDER AND 15-POUNDER GUN MOUNTS (STEMS 2" LONG)*—Continued.

INNER BASES, 15-POUNDER GUN MOUNTS, STEEL CASTINGS—Continued.

| No. of test. | | Diameter. | | | | Elongation in 2 inches. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Per cent.* | *Per cent.* | | " | " |
| 6948 | A 64 I B 15 | .505 | 20 | 31,000 | 65,100 | 18.0 | 16.9 | Granular, silky spot at circumference | .18, | .18* |
| 6970 | A 65 I B 15 | .505 | .20 | 28,000 | 72,400 | 18.0 | 16.9 | Granular, dull spot at circumference | .12, | .14 |
| 6995 | A 65 I B 15 | .505 | .20 | 34,000 | 77,900 | 28.0 | 30.7 | Granular 55 per cent, silky 45 per cent | .24*, | .22* |
| 6975 | A 66 I B 15 | .505 | .20 | 28,000 | 71,600 | 9.5 | 9.5 | Granular, silky spot at circumference | .10*, | .09 |
| 6996 | A 66 2 I B 15 | .505 | .20 | 29,000 | 71,600 | 25.5 | 30.7 | Granular 60 per cent, silky 40 per cent | .19, | .28 |
| 7005 | A 67 I B 15 | .505 | .20 | 35,000 | 72,000 | 28.0 | 27.4 | Granular, silky spot at circumference | .20, | .26* |
| 7024 | A 68 I B 15 | .505 | .20 | 27,000 | 65,400 | 18.5 | 20.5 | Granular 60 per cent, silky oblique 40 per cent | .18, | .19* |
| 7079 | A 69 I B 15 | .505 | .20 | 31,000 | 70,900 | 17.5 | 20.5 | Granular 80 per cent, silky 20 per cent | .19*, | .16 |
| 7080 | A 70 I B 15 | .505 | .20 | 25,000 | 49,800 | 5.5 | 9.5 | Dull amorphous, spongy spot | .09*, | .08 |
| 7143 | A 70 2 I B 15 | .505 | .20 | 33,000 | 71,500 | 21.5 | 23.9 | Granular 80 per cent, silky 20 per cent | .26*, | .17 |
| 7132 | A 71 I B 15 | .505 | .20 | 27,000 | 69,000 | 19.0 | 16.9 | Granular, silky spot at circumference | .19*, | .19 |
| 7133 | A 72 I B 15 | .505 | .20 | 31,000 | 67,450 | 14.5 | 16.9 | Granular 80 per cent, silky 20 per cent | .16*, | .13 |
| 7155 | A 72 2 I B 15 | .505 | .20 | 31,000 | 67,000 | 26.0 | 34.0 | Silky, trace of granulation | .31*, | .21 |
| 7144 | A 73 I B 15 | .505 | .20 | 31,000 | 70,400 | 21.5 | 27.4 | Granular, silky spot at circumference | .23*, | .20 |
| 7145 | A 74 I B 15 | .505 | .20 | 35,000 | 74,000 | 16.5 | 20.5 | .....do | 17*, | .16 |
| 7172 | A 75 I B 15 | .505 | .20 | 29,000 | 68,500 | 15.0 | 16.9 | .....do | .14, | .16* |
| 7202 | A 75 2 I B 15 | .505 | .20 | 27,000 | 67,950 | 13.0 | 16.9 | .....do | .15*, | .11 |
| 7173 | A 76 I B 15 | .505 | .20 | 32,000 | 69,100 | 14.0 | 16.9 | .....do | .14*, | .14 |
| 7203 | A 76 2 I B 15 | .505 | .20 | 33,000 | 72,500 | 18.5 | 20.5 | Granular 75 per cent, silky 25 per cent | .17, | .20* |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7163 | A 77 I B 15 | .505 | .20 | 31,000 | 68.950 | 22.0 | 23.9 | Granular 80 per cent, silky 20 per cent | .20, .24 |
| 7164 | A 78 I B 15 | .505 | .20 | 34,000 | 69,400 | 21.0 | 20.5 | .....do | .18, .24* |
| 7191 | A 79 I B 15 | .505 | .20 | 33,000 | 76,100 | 17.0 | 20.5 | Granular, silky spot at circumference | .17, .17* |
| 7192 | A 80 I B 15 | .505 | .20 | 22,000 | 67,400 | 23.0 | 30.7 | .....do | .20, .26* |
| 7198 | A 81 I B 15 | .505 | .20 | 23,000 | 67,500 | 17.5 | 16.9 | Granular, silvery luster, silky spot at the circumference | .17, .18* |

OUTER BASES, 15-POUNDER GUN MOUNTS, STEEL CASTINGS.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 6959 | D 13 O B 15 | .505 | .20 | 33,000 | 68,000 | 11.0 | 13.2 | Dull amorphous, oblique, small granular spots | .15*, .07 |
| 6960 | D 14 O B 15 | .505 | .20 | 36,000 | 66,550 | 11.0 | 16.9 | Granular 50 per cent, dull amorphous 50 per cent | .13*, .08 |
| 6961 | D 29 O B 15 | .505 | .20 | 26,000 | 59,100 | 7.0 | 13.2 | Granular, spongy spot at circumference | .05, .09* |
| 6962 | D 45 O B 15 | .505 | .20 | 20,000 | 58,200 | 26.0 | 27.4 | Granular, dull spongy at circumference | .22, .30* |
| 6963 | D 46 O B 15 | .505 | .20 | 20,000 | 58,350 | 23.5 | 30.7 | Granular, dull silky center | .23*, .18 |
| 6974 | D 49 O B 15 | .505 | .20 | 29,000 | 80,400 | 16.0 | 16.9 | Granular, silky spot at circumference | .15, .17* |
| 6985 | D 50 O B 15 | .505 | .20 | 33,000 | 55,100 | 8.0 | 9.5 | Dull amorphous oblique | .11, .05 |
| 7027 | D 51 O B 15 | .505 | .20 | 30,000 | 99,100 | 11.5 | 13.2 | Granular | .10, .13 |
| 7028 | D 52 O B 15 | .505 | .20 | 26,000 | 67,500 | 11.0 | 13.2 | Granular, dull amorphous center | .10, .12* |
| 7081 | D 53 O B 15 | .505 | .20 | 34,000 | 74,750 | 19.0 | 20.5 | Granular, silky spot at circumference | .19, .19* |
| 7082 | D 54 O B 15 | .505 | .20 | 29,000 | 69,550 | 9.5 | 13.2 | Granular, silky spot on one side with cavity | .10*, .09 |
| 7170 | D 54 2 O B 15 | .505 | .20 | 27,000 | 72,850 | 16.0 | 16.9 | Granular, silky spot at circumference | .16*, .16* |
| 7089 | D 55 O B 15 | .505 | .20 | 28,000 | 72,050 | 13.5 | 13.2 | .....do | .12, .15* |
| 7130 | D 56 O B 15 | .505 | .20 | 33,000 | 81,000 | 17.5 | 13.2 | .....do | .18*, .17 |
| 7131 | D 57 O B 15 | .505 | .20 | 34,000 | 78,950 | 18.0 | 16.9 | .....do | .17, .19* |
| 7146 | D 58 O B 15 | .505 | .20 | 34,000 | 74,900 | 18.0 | 20.5 | .....do | .16, .20* |
| 7171 | D 59 O B 15 | .505 | .20 | 29,000 | 68,950 | 16.0 | 16.9 | .....do | .15, .17* |
| 7162 | D 60 O B 15 | .505 | .20 | 30,000 | 75,500 | 17.0 | 16.9 | .....do | .17, .17* |

## *TABULATION OF STEEL SPECIMENS FROM 6-POUNDER AND 15-POUNDER GUN MOUNTS (STEMS 8″ LONG)*—Continued.

### OUTER BASES, 15-POUNDER GUN MOUNTS, STEEL CASTINGS—Continued.

| No. of test. | Marks. | Diameter. | Sectional area. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation in 2 inches. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Per cent.* | *Per cent* | | ″ | ″ |
| 7180 | D 61 O B 15 | .505 | .20 | 29,000 | 64,950 | 13.5 | 13.2 | Granular 60 per cent, silky 40 per cent | .12, | .15* |
| 7181 | D 62 O B 15 | .505 | .20 | 29,000 | 65,000 | 15.0 | 16.9 | Silky, trace of granulation | .15, | .15* |
| 7182 | D 63 O B 15 | .505 | .20 | 32,000 | 70,100 | 19.5 | 20.5 | Granular 80 per cent, silky 20 per cent | .21*, | .18 |
| 7183 | D 64 O B 15 | .505 | .20 | 32,000 | 73,600 | 17.5 | 20.5 | Granular 90 per cent, silky 10 per cent | .16, | .19* |
| 7190 | D 65 O B 15 | .505 | .20 | 27,000 | 64,400 | 7.5 | 9.5 | Granular 85 per cent, silky 15 per cent | .06, | .09* |
| 7201 | D 66 O B 15 | .505 | .20 | 29,000 | 72,400 | 15.5 | 16.9 | Granular 80 per cent, silky 20 per cent | .16*, | .15 |

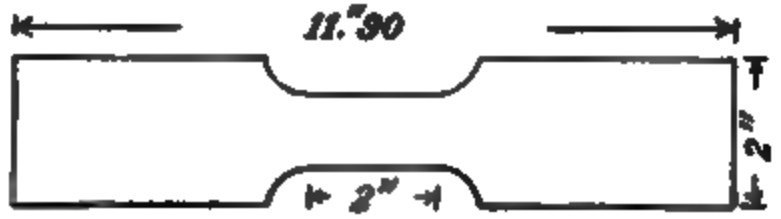
### PISTON RODS, 15-POUNDER GUN MOUNTS, STEEL FORGINGS.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 6885 | A 81 P R 15 | .505 | .20 | 39,000 | 77,600 | 27.0 | 40.3 | | .32*, | .22 |
| 6886 | A 82 P R 15 | .505 | .20 | 38,000 | 78,050 | 27.0 | 40.3 | | .32*, | .22 |

### CASEMATE MOUNTS, 15-POUNDER GUNS, STEEL CASTINGS.

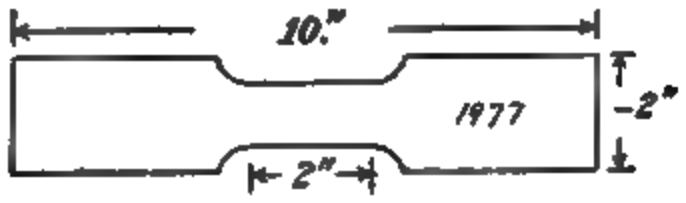
| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 6462 | A 1 C M 15 | .505 | .20 | 24,000 | 63,950 | 13.0 | 16.9 | | .16, | .18* |
| 6463 | A 2 C M 15 | .505 | .20 | 20,000 | 54,850 | 8.0 | 16.9 | | .07, | .09* |
| 6518 | A 2 2 C M 15 | .505 | .20 | 22,000 | 61,950 | 13.0 | 13.2 | | .14*, | .12 |

## Steel Trail Plates, 2-pounder Mounts.



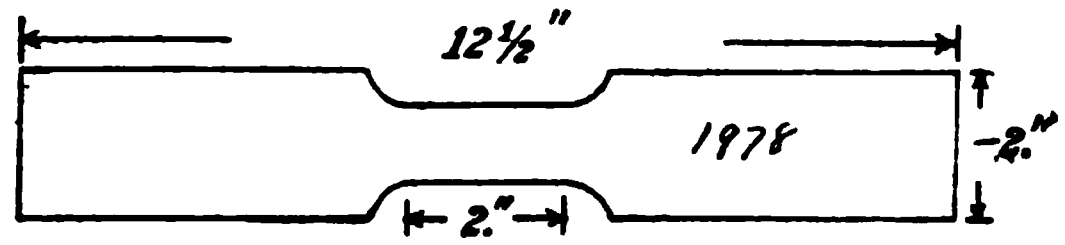

| No. of test. | Mark. | Dimensions. | | Sectional area. | Ultimate strength. | | Elongation in 2 inches. | | Area at fracture. | Contraction of area. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Width. | Thickness. | | Total. | Per square inch. | | | | |
| | | *Inches.* | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Inch.* | *Per cent.* | *In. In. Sq. in.* | *Per cent* |
| 9774 | 1 | 1.00 | .125 | .125 | 8,290 | 66,320 | .45 | 22.5 | .90×.09=.081 | 35. |
| 9775 | 2 | 1.00 | .126 | .126 | 8,640 | 68,570 | .49 | 24.5 | .86×.08=.069 | 45. |
| 9776 | 4 | 1.00 | .124 | .124 | 8,180 | 65,970 | .54 | 27.0 | .87×.08=.070 | 43. |
| 9777 | 5 | 1.00 | .123 | .123 | 8,240 | 66,990 | .51 | 25.5 | .86×.07=.060 | 51. |

## Steel Tail Pieces, 6-pounder Mounts.




| No. of test. | Mark. | Dimensions. | | | Ultimate strength. | | Elongation of inch sections. | |
|---|---|---|---|---|---|---|---|---|
| | | Width. | Thickness. | Sectional area. | Total. | Per square inch. | | |
| | | *Inches.* | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *n* | *n* |
| 9726 | $\frac{1}{T}$ P 6 | 1.001 | .247 | .247 | 14,120 | 57,170 | .21, | .49* |
| 9727 | $\frac{2}{T}$ P 6 | 1.000 | .227 | .227 | 14,490 | 63,830 | .34*, | .25 |

## STEEL TRAILS, 6-POUNDER MOUNTS.




| No. of tets. | Mark. | Dimensions. | | Sectional area. | Ultimate strength. | | Elongation in 2 inches. | | Area at fracture. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Width. | Thickness. | | Total. | Per square inch. | | | | | | | |
| | | *Inches.* | *Inch.* | *Sq. in.* | *Pounds.* | *Pounds.* | *Inch.* | *Per cent.* | *In. In. Sq. in.* | *Per cent.* | | *n* | *n* |
| 9749 | A 3 T 6 | 1.001 | .260 | .260 | 16,790 | 64,580 | .65 | 32.5 | .77×.17=.131 | 49.6 | Silky | .40* | .25 |
| 9750 | A 4 T 6 | 1.000 | .256 | .256 | 15,810 | 61,760 | .67 | 33.5 | .76×.16=.122 | 52.3 | do | .47* | .20 |
| 9751 | A 5 T 6 | 1.001 | .256 | .256 | 16,220 | 63,360 | .69 | 34.5 | .77×.18=.139 | 45.7 | do | .45* | .24 |
| 9752 | A 6 T 6 | 1.001 | .254 | .254 | 16,290 | 64,130 | .69 | 34.5 | .78×.16=.125 | 50.8 | do | .25 | .44* |
| 9753 | A 7 T 6 | 1.001 | .248 | .248 | 16,080 | 64,640 | .68 | 34.0 | .78×.16=.125 | 49.6 | do | .44* | .24 |
| 9754 | A 8 T 6 | 1.001 | .248 | .248 | 16,070 | 64,800 | .65 | 32.5 | .79×.17=.134 | 45.9 | do | .39* | .26 |
| 9755 | A 9 T 6 | 1.000 | .243 | .243 | 15,200 | 62,550 | .64 | 32.0 | .78×.16=.125 | 48.6 | do | .30* | .34* |
| 9756 | A 10 T 6 | 1.001 | .241 | .241 | 15,220 | 63,150 | .65 | 32.5 | .78×.15=.117 | 51.5 | do | .28 | .37* |
| 9764 | 11 T 6 | 1.000 | .275 | .275 | 16,300 | 59,270 | .80 | 40.0 | .73×.17=.124 | 54.9 | do | .26 | .54* |
| 9765 | 12 T 6 | 1.000 | .270 | .270 | 17,080 | 63,260 | .72 | 36.0 | .75×.17=.127 | 58.0 | Silky, seam at center | .40* | .32 |
| 9766 | 13 T 6 | .999 | .269 | .269 | 16,320 | 60,670 | .77 | 38.5 | .72×.16=.115 | 57.2 | Silky | .27 | .50* |
| 9767 | 14 T 6 | .999 | .269 | .269 | 17,200 | 63,940 | .70 | 35.0 | .76×.18=.137 | 49.1 | do | .41* | .29 |
| 9768 | 15 T 6 | 1.000 | .248 | .248 | 15,980 | 64,430 | .66 | 33.0 | .76×.15=.114 | 54. | do | .25 | .41* |
| 9769 | 16 T 6 | .999 | .259 | .259 | 17,120 | 66,100 | .68 | 34.0 | .77×.16=.123 | 52.5 | do | .40* | .28 |

## STEEL FOR GATLING GUN BARRELS.

No. 6899.

Marks, G G C.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

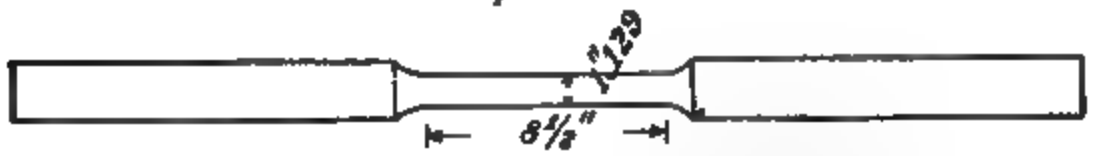
| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0, | Initial load. |
| 5,000 | .000100 | .000100 | 0. | ..... | |
| 10,000 | .000300 | .000200 | ..... | ..... | |
| 20,000 | .000633 | .000333 | ..... | ..... | |
| 30,000 | .001000 | .000367 | ..... | ..... | |
| 40,000 | .001333 | .000333 | ..... | ..... | |
| 50,000 | .001667 | .000334 | 0. | ..... | |
| 60,000 | .002000 | .000333 | ..... | ..... | |
| 68,000 | .002333 | .000333 | ..... | ..... | |
| 69,000 | .002367 | .000034 | ..... | ..... | Elastic limit. |
| | .008667 | .006300 | ..... | ..... | |
| 70,000 | .009000 | .000333 | ..... | ..... | |
| 72,000 | .009500 | .000500 | ..... | ..... | |
| 76,000 | .012667 | .003167 | ..... | ..... | |
| 80,000 | .015333 | .002666 | ..... | ..... | |
| 84,000 | .018333 | .003000 | ..... | ..... | |
| 88,000 | .021833 | .003500 | ..... | ..... | |
| 92,000 | .025667 | .003834 | ..... | ..... | |
| 96,000 | .030000 | .004333 | ..... | ..... | |
| 100,000 | .035000 | .005000 | ..... | ..... | |
| 117,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 117,600 |
| Elastic limit per square inch of original section | do... | 69,000 |
| Elongation per inch after rupture | inch.. | .1667 |
| Elongation per inch under strain at elastic limit | do... | .002367 |
| Reduction in diameter at point of rupture | do... | .125 |
| Reduction in area after rupture, per cent of original section | | 43.8 |
| Position of rupture | | 1.″5 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.10, ″.28*, ″.12 |

## Anchor Bolts for Gun Carriages.

*Tension specimens.*




*Bending specimens.*

1." x 1."

| No. of test. | Description. | Diameter. | Sectional area. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation in 8 inches. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. | Bending tests. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Inches.* | *Sq. inches.* | *Pounds.* | *Pounds.* | *Per cent.* | *Per cent.* | | | |
| 9675 | 1¼-inch bolt for New London, Conn. | 1.129 | 1.00 | 35,300. | 65,420 | 29.8 | 57.0 | Finesilky, cupshaped | ".19, ".24, ".29, ".69*, ".37, ".23, ".22, ".16. | Bent cold 180° and closed down without fracture on the tension side. A shearing fracture opened on the compression side of the bend. |
| 9692 | 2¼-inch bolt for New London, Conn. | 1.129 | 1.00 | 29,300 | 59,620 | 29.7 | 47.2 | Silky | ".23, ".22, ".25, ".28, ".53*, ".42, ".25, ".18. | Bent cold 180° and closed down without fracture. |
| 9693 | 2-inch bolt for New London, Conn. | 1.129 | 1.00 | 29,250 | 57,740 | 30.9 | 55.8 | .....do | ".22, ".25, ".25, ".24, ".70*, ".29*, .24, ".18. | Do. |
| 10257 | 2-inch bolt for Fort Foster, Me. Marks 12486. | 1.129 | 1.00 | 30,500 | 57,310 | 29.9 | 58.1 | .....do | ".19, ".20, ".23, ".28, ".30, ".73*, ".30, ".21. | Bent cold 180° and closed down without fracture on the tension side. |
| 10255 | 1¼-inch bolt | 1.129 | 1.00 | 37,400 | 62,650 | 30.6 | 55.8 | .....do | ".25, ".71*, ".31, ".24, ".25, ".24, ".24, ".21. | Do. |
| 10256 | 1¼-inch bolt | 1.129 | 1.00 | 38,600 | 64,800 | 28.2 | 53.4 | .....do | ".18, ".21, ".22, ".46, ".52*, ".26, ".23, ".18. | Do. |
| 9700 | From Sandy Hook Proving Ground. | 1.129 | 1.00 | 35,300 | 54,900 | 32.8 | 59.8 | .....do | ".23, ".25, ".25, ".29, ".70*, ".40, ".25, ".21. | Bent cold 180° and closed down. A shearing fracture occurred on the inside of the bend. On the tension side of the bend the metal did not fracture. |
| 9702 | .....do | 1.129 | 1.00 | 32,800 | 64,200 | 28.9 | 48.5 | Silky, trace of granulation. | ".19, ".24, ".29, ".60*, ".33, ".25, ".22, ".19 | losing down a veloped, sepa- |
| 9703 | .....do | 1.129 | 1.00 | 40,400 | 59,700 | 29.6 | 52.2 | Silky | ".20, ".22, ".26, ".27, ".54*, ".42, ".27, ".19. | closed down |
| 9704 | .....do | 1.129 | 1.00 | 35,200 | 55,900 | 32.4 | 57.0 | .....do | ".20, ".27, ".29, ".70*, ".41, ".26, ".26, ".20. | losing down a veloped, sepa- |

## Anchor Bolts for Gun Carriages—Continued.

| No. of test. | Description. | Diameter. | Sectional area. | Elastic limit per square inch. | Tensile strength per square inch. | Elongation in 8 inches. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. | Bending tests. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Inches.* | *Sq. inches.* | *Pounds.* | *Pounds.* | *Per cent.* | *Per cent.* | | | |
| 9770 | From Sandy Hook Proving Ground. | 1.129 | 1.00 | 46,800 | 74,100 | 25.3 | 36.4 | Silky, interspersed with fine granulation 70 per cent, silky 30 per cent. | ″.20, ″.20, ″.26, ″.44*, ″.30, ″.24, ″.20, ″.18. | Bent cold 1 shearing inside of granular on the te |
| 9771 | .....do..... | 1.129 | 1.00 | 30,100 | 53,980 | 8.8 | 8.4 | Granular, with dull silky spot at the circumference; opened cracks along the stem in vicinity of fracture | ″.13*, ″.09, ″.08, ″.09, ″.08, ″.08, ″.07, ″.08. | Bent cold 140°, and then fractured in the quarter, from the tension side. Appearance granular. |
| 9871 | .....do..... | .564 | .25 | 39,920 | 71,360 | [1]25.0 | 44.6 | Silky..... | ″.18, ″.28, ″.40*, ″.19.... | |
| 9872 | .....do..... | .564 | .25 | 42,400 | 71,080 | [1]25.2 | 44.6 | .....do..... | ″.20, ″.42*, ″.23, ″.16.... | |
| 9895 | .....do..... | 1.129 | 1.00 | 57,100 | 88,900 | 19.1 | 29.1 | Fine granular 60 per cent, silky 40 per cent. | ″.14, ″.17, ″.21, ″.33*, ″.24, ″.17, ″.15, ″.12. | Bent cold through an angle of 145°, and then fractured from the tension side. Appearance silky on the outside of the bend, fine granular on the inside. |
| 9918 | .....do..... | 1.129 | 1.00 | 35,600 | 56,880 | 31.6 | 51.0 | Silky..... | ″.20, ″.26, ″.28, ″.34, ″.60*, ″.33, ″.25, ″.21. | Bent cold 180° and closed down without fracture |

[1] Elongation in 4 inches.

NOTE.—Specimens from Sandy Hook have threaded ends

## Piston Rods.

PROOF STRESS APPLIED TO PISTON RODS FOR GUN CARRIAGES.

| Description. | Total length. | Diameters. | | | Tensile stress applied. |
|---|---|---|---|---|---|
| | | Maximum. | Minimum. | Root of thread. | |
| | *Inches.* | *Inches.* | *Inches.* | *Inches.* | *Pounds.* |
| 6″ disappearing carriage | 119.25 | 2.50 | 2.125 | 2.015 | 40,000 |
| 8″ disappearing carriage | 172.75 | 3.50 | 3.00 | 2.89 | 90,000 |
| Rapid-fire gun carriage | 32.50 | 3.75 | ..... | ..... | 100,000 |
| 10″ barbette carriage | 93.00 | 4.00 | ..... | ..... | 281,950 |
| 10″ disappearing carriage | 179.45 | 3.50 | 3.00 | 2.83 | 125,000 |
| 12″ disappearing carriage | 219.75 | 4.75 | 4.25 | 4.07 | 150,000 |

## Suspension Rods.

PROOF STRESS APPLIED TO SUSPENSION RODS FOR COUNTER-WEIGHTS FOR DISAPPEARING GUN CARRIAGES.

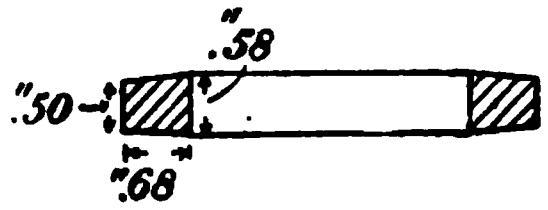
| Description. | Diameter of rod. | Diameter at root of thread. | Tensile stress applied. |
|---|---|---|---|
| | *Inches.* | *Inches.* | *Pounds.* |
| 6″ disappearing carriage | 2½ | 2½ | 50,000 |
| 8″ disappearing carriage | 3½ | 3½ | 102,000 |
| 10″ disappearing carriage | 4½ | 4.3 | 174,000 |

# HELICAL SPRINGS FOR MORTAR CARRIAGES.

## COMPRESSION TESTS OF HELICAL SPRINGS FOR 7-INCH MORTAR CARRIAGES. MODEL 1895.

Springs branded "French ☞ G. E. 6–99."

COUNTER RECOIL SPRINGS.

Cross 

section.

| No. of spring. | Weight. | Exterior diameter. | Diameter of wire. | Height unloaded. | Load when compressed to height of 6 inches. | Closed down. | | Load when returned to height of 6 inches. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Load. | Height. | |
| | *Lbs. oz.* | *Inches.* | *Inch.* | *Inches.* | *Pounds.* | *Pounds.* | *Inches.* | *Pounds.* |
| 1 | 8 2½ | 4.35 | .58×.68 | 7.22 | 1,185 | 3,200 | 4.05 | 900 |
| 2 | 8 6 | 4.40 | .60×.70 | 7.15 | 1,282 | 3,500 | 4.12 | 1,070 |
| 3 | 8 3½ | 4.40 | .60×.70 | 7.30 | 1,275 | 3,300 | 4.12 | 1,089 |
| 4 | 8 4 | 4.40 | .59×.70 | 7.42 | 1,400 | 3,500 | 4.12 | 1,260 |
| 5 | 8 8½ | 4.40 | .60×.70 | 7.38 | 1,435 | 3,700 | 4.17 | 1,280 |
| 6 | 8 5½ | 4.40 | .60×.70 | 7.13 | 1,165 | 3,200 | 4.04 | 955 |
| 7 | 8 2 | 4.40 | .58×.69 | 7.20 | 1,200 | 3,300 | 4.11 | 1,026 |
| 8 | 8 8½ | 4.45 | .60×.72 | 7.10 | 1,077 | 3,300 | 4.10 | 900 |
| 9 | 8 1 | 4.36 | .59×.68 | 7.30 | 1,290 | 3,200 | 4.11 | 1,125 |
| 10 | 8 5 | 4.40 | .60×.70 | 7.30 | 1,300 | 3,200 | 4.12 | 1,091 |

The fifth spring was closed down and so remained for a period of sixteen hours, at the end of which time the load sustained was 1,235 pounds when returned to a height of 6 inches.

The spring was further loaded 100 times, being closed to a height of 4¼ inches and released to a height of 6 inches between each loading.

Load sustained when 4¼ inches high at one hundredth loading, 3,470 pounds.

Load sustained when 6 inches high at one hundredth loading, 1,306 pounds.

## COMPRESSION TEST OF HELICAL SPRINGS FOR 6-INCH DISAPPEARING GUN CARRIAGE. L. F. MODEL 1898.

ELEVATING WORM SPRING.

| Weight. | Exterior diameter. | Diameter of wire. | Height unloaded. | Load when compressed to height of 7 inches. | Height of spring at 2,000 pounds load. | Closed down. | | Height at 2,000 pounds load. | Load at height of 7 inches. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Load. | Height. | | |
| *Lbs. oz.* | *Inches.* | *Inch.* | *Inches.* | *Pounds.* | *Inches.* | *Pounds.* | *Inches.* | *Inches.* | *Pounds.* |
| 8 12½ | 3.80 | .75 | 7.60 | 1,775 | 6.92 | 5,900 | 5.53 | 6.80 | 1,460 |

BUFFER SPRING.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 9½ | 2.00 | .40 | 5.22 | ..... | ..... | 2,100 | 3.63 | ..... | ..... |

## Compression of Helical Springs for 7-inch Siege Mortars, Steel.

| No. of spring. | Weight. | Diameters. | | Diameter of wire. | Distance between coils. | Height unloaded. | Load when compressed to height of 6 inches. | Height under 1,000-pound load. | Closed down. | | Load when 6 inches high. | Height under 1,000-pound load. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Exterior. | Interior. | | | | | | Height. | Load. | | |
| | *Lbs. oz.* | *In.* | *In.* | *In.* | *In.* | *Inches.* | *Pounds.* | *Inches.* | *Inches.* | *Lbs.* | *Lbs.* | *Inches.* |
| 1 | 7 9 | 4.93 | 3.59 | .67 | .82 | 7.50 | 1,170 | 6.18 | 3.81 | 3,180 | 1,028 | ..... |
| 2 | 7 9⅛ | 4.95 | 3.61 | .67 | .81 | 7.63 | 1,242 | 6.28 | 3.80 | 3,240 | 1,124 | 6.14 |
| 3 | 7 9⅛ | 4.98 | 3.64 | .67 | .79 | 7.35 | 978 | 5.98 | 3.90 | 2,920 | 885 | 5.84 |
| 4 | 7 12⅛ | 4.94 | 3.60 | .67 | .80 | 7.50 | 1,170 | 6.18 | 3.98 | 3,150 | 1,038 | 6.04 |
| 5 | 7 13⅛ | 4.95 | 3.61 | .67 | .80 | 7.72 | 1,364 | 6.42 | 3.93 | 3,260 | 1,260 | 6.27 |
| 6 | 7 10⅛ | 4.98 | 3.64 | .67 | .79 | 7.27 | 1,035 | 6.02 | 3.88 | 3,110 | 935 | 5.93 |
| 7 | 7 12⅛ | 4.98 | 3.64 | .67 | .78 | 7.35 | 1,107 | 6.11 | 3.90 | 3,160 | 1,000 | 6.00 |
| 8 | 7 9 | 4.95 | 3.61 | .67 | .80 | 7.33 | 1,089 | 6.10 | 3.84 | 3,140 | 987 | 5.99 |
| 9 | 7 11⅛ | 4.95 | 3.59 | .68 | .80 | 7.30 | 1,000 | 6.00 | 3.90 | 3,150 | 914 | 5.91 |
| 10 | 7 9 | 4.95 | 3.61 | .67 | .82 | 7.55 | 1,168 | 6.19 | 3.84 | 3,200 | 1,054 | 6.08 |

## HELICAL SPRINGS, DOUBLE COIL, FOR 12-INCH MORTAR CARRIAGES.

### Six springs from lot of 105 received January 29, 1900.

DESCRIPTION OF ONE SPRING.

Outside coil, left-hand spring:
- Exterior diameter of coil ..... inches.. 9.00
- Diameter of bar ..... do... 1.74
- Height of spring unloaded ..... do... 14.36
- Distance between coils ..... do... 1.08
- Weight ..... 84 pounds 12 ounces

Inside coil, right-hand spring:
- Exterior diameter of coil ..... inches.. 5.58
- Diameter of bar ..... do... 1.24
- Height of spring unloaded ..... do... 13.32
- Distance between coils ..... do... .57
- Weight ..... 34 pounds 8 ounces

| Description. | Height. | Load sustained. | Remarks. |
|---|---|---|---|
| | *Inches.* | *Pounds.* | |
| First spring | 12.25 | 18,240 | |
| | 9.75 | 46,250 | |
| | 9.67 | 48,000 | Closed down. |
| | 9.75 | 45,500 | |
| | 12.25 | 13,980 | |
| Second spring | 12.25 | 19,040 | |
| | 9.75 | 54,400 | Most of the coils closed down. |
| | 12.25 | 14,700 | This spring was practically closed down at 49,000 pounds. |
| Third spring | 12.25 | 17,000 | |
| | 9.75 | 44,500 | |
| | 9.68 | 47,000 | Closed down. |
| | 9.75 | 43,700 | |
| | 12.25 | 13,000 | |
| Fourth spring | 12.25 | 18,700 | |
| | 9.75 | 46,700 | Closed down. |
| | 12.25 | 14,550 | |
| Fifth spring | 12.25 | 18,650 | |
| | 9.75 | 46,800 | |
| | 9.70 | 48,000 | Closed down. |
| | 12.25 | 14,900 | |
| Sixth spring | 12.25 | 19,920 | |
| | 9.75 | 51,500 | |
| | 12.25 | 15,500 | This spring was practically closed down at 48,000 pounds. |
| | 10.25 | 40,300 | |

Loaded 100 times, compressing to 10″.25 height and returning to 12″.25 height each time.

Rested 17 hours compressed to 10″.25 after 68 loadings. After 100 loadings the results were as follows:

| | | |
|---|---|---|
| 10.25 | 40,100 | |
| 12.25 | 15,200 | |

Retest of springs after 5 days' rest.

| Description. | Height. | Load sustained. | Remarks. |
|---|---|---|---|
| | *Inches.* | *Pounds.* | |
| First spring | 12.25 | 17,600 | |
| | 9.75 | 46,250 | |
| | 9.67 | 48,000 | |
| | 9.75 | 45,500 | |
| | 11.87 | 18,000 | |
| | 12.25 | 14,000 | |

There appeared a slight recovery immediately following the final reading above, the load appearing to increase to 14,080 pounds under 12″.25 height.

The spring was then allowed to remain strained for a period of 17 hours, at the end of which interval the reaction of the spring remained unchanged, at 14,080 pounds.

TEST RESUMED.

| Description. | Height. | Load sustained. | Remarks. |
|---|---|---|---|
| | *Inches.* | *Pounds.* | |
| First spring ..... | 9.75 | 45,600 | |
| | 12.25 | 13,900 | |
| | 12.62 | 10,000 | |
| | 12.25 | 14,420 | |
| | 12.63 | 10,000 | |
| | 12.83 | 8,000 | |
| | 12.66 | 10,000 | |
| | 12.25 | 14,860 | |
| | 12.66 | 10,000 | |
| | 12.84 | 8,000 | |
| | 13.21 | 5,000 | |
| | 12.91 | 8,000 | |
| | 12.73 | 10,000 | |
| | 12.25 | 15,570 | |
| | 12.71 | 10,000 | |
| | 12.90 | 8,000 | |
| | 13.21 | 5,000 | |
| | 13.58 | 3,000 | |
| | 13.28 | 5,000 | |
| | 12.95 | 8,000 | |
| | 12.77 | 10,000 | |
| | 12.25 | 16,000 | |
| | 11.93 | 20,000 | |
| | 11.50 | 25,000 | |
| | 11.90 | 20,000 | |
| | 12.25 | 15,760 | |
| | 11.90 | 20,000 | |
| | 11.50 | 25,000 | |
| | 11.06 | 30,000 | |
| | 11.45 | 25,000 | |
| | 11.86 | 20,000 | |
| | 12.02 | 18,000 | |
| | 12.25 | 15,350 | |
| | 12.03 | 18,000 | |
| | 11.87 | 20,000 | |
| | 11.47 | 25,000 | |
| | 11.06 | 30,000 | |
| | 10.64 | 35,000 | |
| | 11.01 | 30,000 | |
| | 11.40 | 25,000 | |
| | 11.81 | 20,000 | |
| | 11.98 | 18,000 | |
| | 12.25 | 14,990 | |
| | 12.00 | 18,000 | |
| | 11.84 | 20,000 | |
| | 11.44 | 25,000 | |
| | 11.03 | 30,000 | |
| | 10.63 | 35,000 | |
| | 10.20 | 40,000 | |
| | 10.55 | 35,000 | |
| | 10.93 | 30,000 | |
| | 11.33 | 25,000 | |
| | 11.75 | 20,000 | |
| | 11.93 | 18,000 | |
| | 12.25 | 14,470 | |
| | 11.96 | 18,000 | |
| | 11.74 | 20,000 | |
| | 11.39 | 25,000 | |
| | 10.99 | 30,000 | |
| | 10.60 | 35,000 | |
| | 10.20 | 40,000 | |
| | 9.80 | 45,000 | |
| | 10.10 | 40,000 | |
| | 10.47 | 35,000 | |
| | 10.86 | 30,000 | |
| | 11.26 | 25,000 | |
| | 11.70 | 20,000 | |
| | 11.87 | 18,000 | |
| | 12.25 | 13,920 | |
| | 13.57 | 3,000 | |
| | 12.25 | 15,980 | |
| | 12.07 | 18,000 | |

TEST RESUMED—Continued.

| Description. | Height. | Load sustained. | Remarks. |
|---|---|---|---|
| | *Inches.* | *Pounds.* | |
| Second spring | 12.25 | 18,060 | |
| | 9.75 | 51,080 | |
| | 11.94 | 18,000 | |
| | 12.25 | 14,560 | |
| Third spring | 12.25 | 16,220 | |
| | 12.09 | 18,000 | |
| | 9.75 | 43,960 | |
| | 11.76 | 18,000 | |
| | 12.25 | 12,970 | |
| Fourth spring | 12.25 | 18,030 | |
| | 9.75 | 46,440 | |
| | 11.91 | 18,000 | |
| | 12.25 | 14,360 | |
| Fifth spring | 12.25 | 17,800 | |
| | 12.24 | 18,000 | |
| | 9.75 | 46,240 | |
| | 11.90 | 18,000 | |
| | 12.25 | 14,200 | |
| Sixth spring | 12.25 | 18,960 | |
| | 9.75 | 49,400 | |
| | 11.98 | 18,000 | |
| | 12.25 | 15,080 | |

TESTS OF INSIDE AND OUTSIDE COILS OF FIRST SPRING SEPARATELY.

| Description. | Height. | Load sustained. | Remarks. |
|---|---|---|---|
| | *Inches.* | *Pounds.* | |
| First spring, inside coil | 13.00 | 1,000 | |
| | 12.25 | 4,965 | |
| | 9.75 | 17,660 | |
| | 12.25 | 3,755 | |
| | 12.65 | 2,000 | |
| | 12.46 | 3,000 | |
| | 12.28 | 4,000 | |
| | 12.47 | 3,000 | |
| | 12.64 | 2,000 | |
| | 12.29 | 4,000 | |
| | 11.95 | 6,000 | |
| | 11.58 | 8,000 | |
| | 11.95 | 6,000 | |
| | 12.27 | 4,000 | |
| | 12.65 | 2,000 | |
| | 12.28 | 4,000 | |
| | 11.95 | 6,000 | |
| | 11.59 | 8,000 | |
| | 11.23 | 10,000 | |
| | 10.85 | 12,000 | |
| | 11.19 | 10,000 | |
| | 11.53 | 8,000 | |
| | 11.89 | 6,000 | |
| | 12.25 | 4,000 | |
| | 12.65 | 2,000 | |
| | 12.28 | 4,000 | |
| | 11.95 | 6,000 | |
| | 11.59 | 8,000 | |
| | 11.22 | 10,000 | |
| | 10.86 | 12,000 | |
| | 10.46 | 14,000 | |
| | 10.02 | 16,000 | |
| | 10.38 | 14,000 | |
| | 10.72 | 12,000 | |
| | 11.08 | 10,000 | |
| | 11.44 | 8,000 | |
| | 11.82 | 6,000 | |
| | 12.20 | 4,000 | |
| | 12.64 | 2,000 | |

TESTS OF INSIDE AND OUTSIDE COILS OF FIRST SPRING SEPARATELY—Continued.

| Description. | Height. | Load sustained. | Remarks. |
|---|---|---|---|
| | *Inches.* | *Pounds.* | |
| First spring, inside coil..... | 12.28 | 4,000 | |
| | 11.95 | 6,000 | |
| | 11.59 | 8,000 | |
| | 11.21 | 10,000 | |
| | 10.84 | 12,000 | |
| | 10.46 | 14,000 | |
| | 10.03 | 16,000 | |
| | 9.75 | 18,000 | |
| | 9.97 | 16,000 | |
| | 10.31 | 14,000 | |
| | 10.66 | 12,000 | |
| | 11.01 | 10,000 | |
| | 11.39 | 8,000 | |
| | 11.78 | 6,000 | |
| | 12.18 | 4,000 | |
| | 12.61 | 2,000 | |
| | 13.90 | 2,000 | |
| First spring, outside coil.... | 12.25 | 11,910 | |
| | 9.75 | 28,010 | |
| | 12.25 | 10,190 | |
| | 13.79 | 2,000 | |
| | 13.45 | 4,000 | |
| | 12.78 | 8,000 | |
| | 12.14 | 12,000 | |
| | 12.77 | 8,000 | |
| | 13.42 | 4,000 | |
| | 13.79 | 2,000 | |
| | 13.45 | 4,000 | |
| | 12.79 | 8,000 | |
| | 12.15 | 12,000 | |
| | 11.51 | 16,000 | |
| | 10.89 | 20,000 | |
| | 11.48 | 16,000 | |
| | 12.06 | 12,000 | |
| | 12.71 | 8,000 | |
| | 13.42 | 4,000 | |
| | 13.78 | 2,000 | |
| | 13.44 | 4,000 | |
| | 12.78 | 8,000 | |
| | 12.15 | 12,000 | |
| | 11.51 | 16,000 | |
| | 10.89 | 20,000 | |
| | 10.27 | 24,000 | |
| | 9.75 | 28,000 | |
| | 10.17 | 24,000 | |
| | 10.70 | 20,000 | |
| | 11.30 | 16,000 | |
| | 11.96 | 12,000 | |
| | 12.61 | 8,000 | |
| | 13.36 | 4,000 | |
| | 13.78 | 2,000 | |
| | 12.13 | 12,000 | |
| | 9.74 | 28,000 | |
| | 11.93 | 12,000 | Spring remained under this load 16 hours without sensible change in load or height. |
| | 13.35 | 4,000 | |
| | 13.50 | 3,220 | |
| | 13 | 6,270 | |
| | 12.5 | 9,370 | |
| | 12 | 12,540 | |
| | 11.5 | 15,680 | |
| | 11 | 18,900 | |
| | 10.5 | 22,180 | |
| | 10 | 25,500 | |
| | 9.75 | 27,750 | |
| | 10 | 25,130 | |
| | 10.5 | 21,430 | |
| | 11 | 17,900 | |
| | 11.5 | 14,620 | |
| | 12 | 11,510 | |
| | 12.5 | 8,560 | |
| | 13 | 5,750 | |
| | 13.5 | 3,170 | |

# HELICAL SPRINGS, DOUBLE COIL, FOR 12-INCH MORTAN CARRIAGES.

## Six springs from lot of 101 received March 24, 1900.

DESCRIPTION OF ONE SPRING.

Outside coil, left-hand spring:
- Exterior diameter of coil ..... inches.. 9.15
- Diameter of bar ..... do... 1.75
- Height of spring unloaded ..... do... 14.30
- Distance between coils ..... do... 1.00
- Weight ..... 86 pounds

Inside coil, right-hand spring:
- Exterior diameter of coil ..... inches.. 5.55
- Diameter of bar ..... do... 1.25
- Height of spring unloaded ..... do... 13.68
- Distance between coils ..... do... .58
- Weight ..... 34 pounds 8 ounces

| Description. | Height. | Load sustained. | Remarks. |
|---|---|---|---|
| | *Inches.* | *Pounds.* | |
| First spring | 12.36 | 18,000 | |
| | 12.25 | 19,240 | |
| | 9.75 | 47,200 | |
| | 9.62 | 50,300 | Closed down. |
| | 9.75 | 46,150 | |
| | 11.90 | 18,000 | |
| | 12.25 | 14,300 | |
| Second spring | 12.37 | 18,000 | |
| | 12.25 | 19,340 | |
| | 9.75 | 47,100 | |
| | 9.60 | 52,000 | Closed down. |
| | 9.75 | 45,500 | |
| | 11.93 | 18,000 | |
| | 12.25 | 14,700 | |
| Third spring | 12.25 | 18,000 | |
| | 9.75 | 45,280 | |
| | 9.56 | 52,400 | Closed down. |
| | 9.75 | 43,800 | |
| | 11.78 | 18,000 | |
| | 12.25 | 13,380 | |
| Fourth spring | 12.34 | 18,000 | |
| | 12.25 | 19,060 | |
| | 9.75 | 46,000 | |
| | 9.61 | 50,200 | Closed down. |
| | 9.75 | 44,780 | |
| | 11.87 | 18,000 | |
| | 12.25 | 14,260 | |
| Fifth spring | 12.35 | 18,000 | |
| | 12.25 | 19,200 | |
| | 9.75 | 46,680 | |
| | 9.63 | 51,600 | Closed down. |
| | 9.75 | 45,500 | |
| | 11.91 | 18,000 | |
| | 12.25 | 14,570 | |
| Sixth spring | 12.33 | 18,000 | |
| | 12.25 | 19,000 | |
| | 9.75 | 47,200 | |
| | 9.66 | 52,600 | Closed down. |
| | 9.75 | 46,000 | |
| | 11.90 | 18,000 | |
| | 12.25 | 14,550 | |
| | 10.25 | 39,640 | |
| Loaded 100 times, compressing to 10″.25 and returning to 12″.25 height each time. | | | |
| | 10.25 | 39,640 | |
| | 11.91 | 18,000 | |
| | 12.25 | 14,400 | |
| Closed down and so remained for a period of 16 hours, after which the results were as follows: | | | |
| | 9.75 | 44,650 | |
| | 10.25 | 37,500 | |
| | 11.82 | 18,000 | |
| | 12.25 | 13,500 | |
| | 11.86 | 18,000 | |
| | 10.25 | 38,820 | |
| | 9.75 | 45,520 | |
| | 10.25 | 38,000 | |
| | 11.81 | 18,000 | |
| | 12.25 | 13,400 | |

## Six springs from a lot of 45 received April 9, 1900.

DESCRIPTION OF ONE SPRING.

Outside coil, left-hand spring:
- Exterior diameter of coil ..... inches.. 9.05
- Diameter of bar ..... do... 1.74
- Height of spring unloaded ..... do... 14.20
- Distance between coils ..... do... 1.00
- Weight ..... 84 pounds 12 ounces

Inside coil, right-hand spring:
- Exterior diameter of coil ..... inches.. 5.55
- Diameter of bar ..... do... 1.23
- Height of spring unloaded ..... do... 13.30
- Distance between coils ..... do... .50
- Weight ..... 34 pounds 4 ounces

| Description. | Height. | Load sustained. | Remarks. |
|---|---|---|---|
| | *Inches.* | *Pounds.* | |
| First spring | 12.25 | 17,850 | |
| | 9.75 | 45,075 | |
| | 9.57 | 51,500 | Closed down. |
| | 9.75 | 43,500 | |
| | 11.80 | 18,000 | |
| | 12.25 | 13,640 | |
| | 11.86 | 18,000 | |
| | 9.75 | 44,000 | |
| | 9.57 | 51,500 | Closed down. |
| Spring now closed down and so remained for a period of 16 hours, after which the results were as follows: | | | |
| | 9.59 | 47,960 | |
| | 9.75 | 43,035 | |
| | 11.74 | 18,000 | |
| | 12.25 | 13,300 | |
| | 11.82 | 18,000 | |
| | 9.75 | 43,525 | |
| | 11.76 | 18,000 | |
| | 12.25 | 13,070 | |
| Second spring | 12.25 | 18,000 | |
| | 9.75 | 44,850 | |
| | 9.69 | 45,700 | Closed down. |
| | 9.75 | 43,525 | |
| | 11.82 | 18,000 | |
| | 12.25 | 13,830 | |
| Third spring | 12.25 | 17,970 | |
| | 12.24 | 18,000 | |
| | 9.75 | 44,940 | |
| | 9.61 | 45,900 | Closed down. |
| | 9.75 | 43,100 | |
| | 11.80 | 18,000 | |
| | 12.25 | 13,230 | |
| Fourth spring | 12.25 | 17,110 | |
| | 12.20 | 18,000 | |
| | 9.75 | 43,650 | |
| | 9.63 | 45,200 | Closed down. |
| | 9.75 | 42,720 | |
| | 11.81 | 18,000 | |
| | 12.25 | 13,450 | |
| Fifth spring | 12.25 | 18,000 | |
| | 9.75 | 47,660 | |
| | 9.72 | 49,500 | Closed down. |
| | 9.75 | 46,970 | |
| | 11.86 | 18,000 | |
| | 12.25 | 13,500 | |
| Sixth spring | 12.40 | 18,000 | |
| | 12.25 | 19,400 | |
| | 9.75 | 48,220 | |
| | 9.69 | 51,900 | Closed down. |
| | 9.75 | 47,040 | |
| | 12.00 | 18,000 | |
| | 12.25 | 15,330 | |
| | 10.25 | 40,200 | |
| Loaded 100 times, compressing to 10″.25 and returning to 12″.25 height each time. | | | |
| | 10.25 | 40,000 | |
| | 12.00 | 18,000 | |
| | 12.25 | 15,230 | |

## Six springs from a lot of 60 received April 12, 1900.

### DESCRIPTION OF ONE SPRING.

Outside coil, left-hand spring:
- Exterior diameter of coil ..... inches.. 9.05
- Diameter of bar ..... do... 1.74
- Height of spring unloaded ..... do... 14.30
- Distance between coils ..... do... 1.00
- Weight ..... 85 pounds 8 ounces

Inside coil, right-hand spring:
- Exterior diameter of coil ..... inches.. 5.55
- Diameter of bar ..... do... 1.24
- Height of spring unloaded ..... do... 13.50
- Distance between coils ..... do... .52
- Weight ..... 35 pounds

| Description. | Height. | Load sustained. | Remarks. |
|---|---|---|---|
| | *Inches.* | *Pounds.* | |
| First spring ..... | 12.25 | 17,200 | |
| | 12.15 | 18,000 | |
| | 9.75 | 46,500 | Closed down. |
| | 11.90 | 18,000 | |
| | 12.25 | 13,930 | |
| Second spring ..... | 12.29 | 18,000 | |
| | 12.25 | 18,570 | |
| | 9.75 | 44,980 | |
| | 9.65 | 46,300 | Closed down. |
| | 9.75 | 43,300 | |
| | 11.83 | 18,000 | |
| | 12.25 | 13,710 | |
| Third spring ..... | 12.25 | 17,870 | |
| | 12.24 | 18,000 | |
| | 9.75 | 44,860 | |
| | 9.65 | 48,600 | Closed down. |
| | 9.75 | 44,030 | |
| | 11.85 | 18,000 | |
| | 12.25 | 14,420 | |
| Fourth spring ..... | 12.25 | 17,900 | |
| | 12.23 | 18,000 | |
| | 9.75 | 45,000 | |
| | 9.65 | 48,200 | Closed down. |
| | 9.75 | 44,300 | |
| | 11.84 | 18,000 | |
| | 12.25 | 13,880 | |
| Fifth spring ..... | 12.25 | 17,000 | |
| | 12.17 | 18,000 | |
| | 9.75 | 43,650 | |
| | 9.60 | 47,300 | Closed down. |
| | 9.75 | 42,100 | |
| | 11.79 | 18,000 | |
| | 12.25 | 12,740 | |
| Sixth spring ..... | 12.35 | 18,000 | |
| | 12.25 | 19,160 | |
| | 9.75 | 46,240 | |
| | 9.60 | 50,300 | Closed down. |
| | 9.75 | 44,750 | |
| | 11.90 | 18,000 | |
| | 12.25 | 14,400 | |
| | 11.95 | 18,000 | |
| | 9.75 | 45,500 | |
| | 9.60 | 50,300 | |
| Spring now closed down and so remained for a period of 42½ hours, after which the results were as follows: | | | |
| | 9.63 | 47,270 | |
| | 9.75 | 44,100 | |
| | 11.82 | 18,000 | |
| | 12.25 | 13,650 | |
| | 11.88 | 18,000 | |
| | 9.75 | 45,150 | |
| | 11.82 | 18,000 | |
| | 12.25 | 13,300 | |
| | 10.25 | 38,300 | |
| Loaded 100 times, compressing to 10″.25 and returning to 12″.25 height each time. | | | |
| | 10.25 | 38,700 | |
| | 11.85 | 18,000 | |
| | 12.25 | 13,370 | |

## Six springs from lot of 25 received April 16, 1900.

DESCRIPTION OF ONE SPRING.

Outside coil, left-hand spring:
- Exterior diameter of coil ..... inches.. 9.05
- Diameter of bar ..... do... 1.74
- Height of spring unloaded ..... do... 14.37
- Distance between coils ..... do... 1.00
- Weight ..... 86¼ pounds

Inside coil, right-hand spring:
- Exterior diameter of coil ..... inches.. 5.55
- Diameter of bar ..... do... 1.24
- Height of spring unloaded ..... do... 13.45
- Distance between coils ..... do... .58
- Weight ..... 34½ pounds

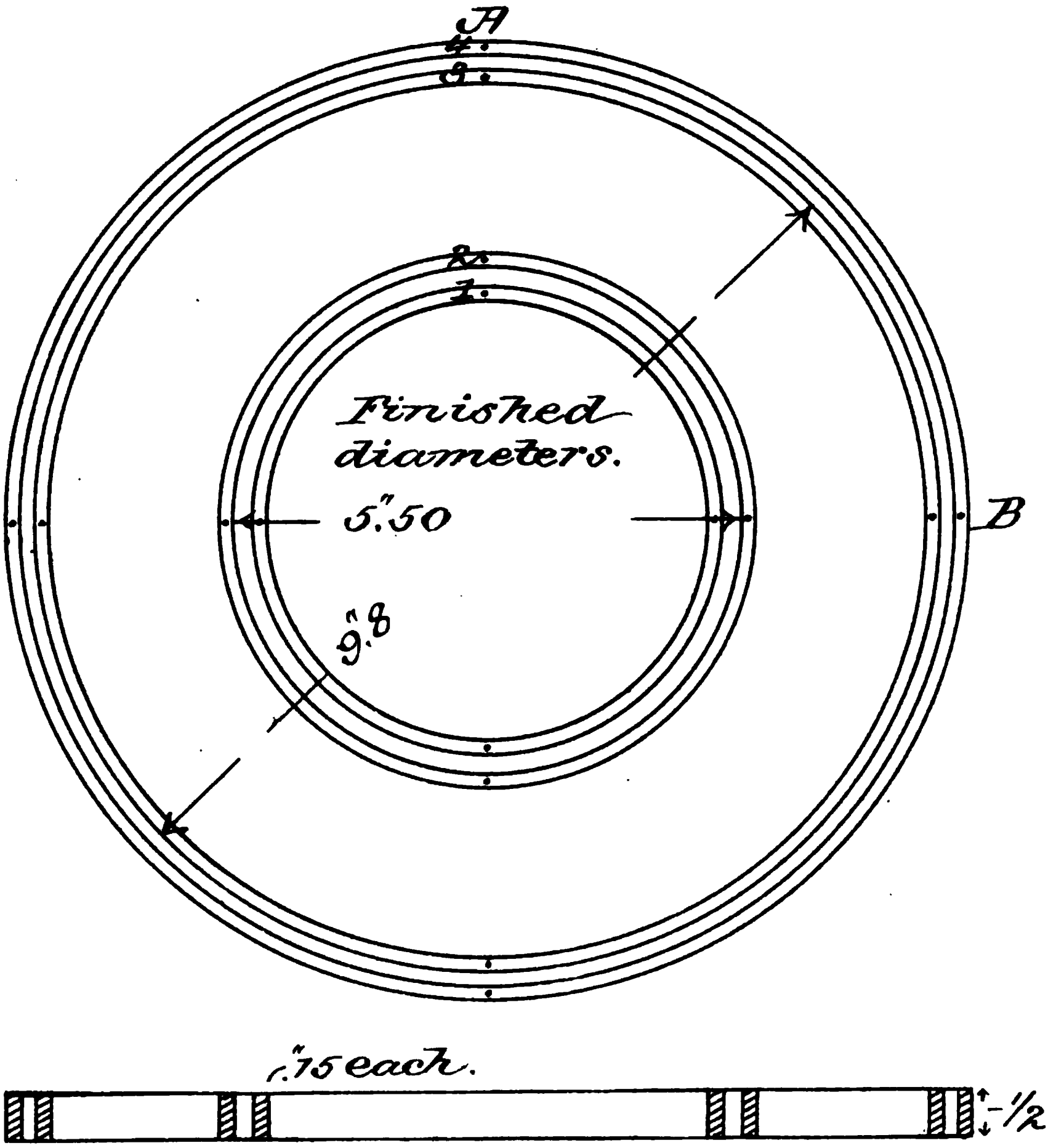
| Description. | Height. | Load sustained. | Remarks. |
|---|---|---|---|
| | *Inches.* | *Pounds.* | |
| First spring | 12.44 | 18,000 | |
| | 12.25 | 20,600 | |
| | 9.75 | 47,500 | Closed down. |
| | 11.98 | 18,000 | |
| | 12.25 | 15,200 | |
| Second spring | 12.25 | 16,860 | |
| | 12.15 | 18,000 | |
| | 9.75 | 41,000 | |
| | 9.55 | 43,200 | Closed down. |
| | 9.75 | 39,800 | |
| | 11.65 | 18,000 | |
| | 12.25 | 12,350 | |
| Third spring | 12.30 | 18,000 | |
| | 12.25 | 18,700 | |
| | 9.75 | 46,300 | Closed down. |
| | 11.88 | 19,000 | |
| | 12.25 | 14,200 | |
| Fourth spring | 12.25 | 17,840 | |
| | 12.20 | 18,000 | |
| | 9.75 | 43,650 | |
| | 9.58 | 45,500 | Closed down. |
| | 9.75 | 42,440 | |
| | 11.77 | 18,000 | |
| | 12.25 | 13,100 | |
| Fifth spring | 12.27 | 18,000 | |
| | 12.25 | 18,200 | |
| | 9.75 | 48,300 | |
| | 9.65 | 54,600 | Closed down. |
| | 9.75 | 44,900 | |
| | 11.85 | 18,000 | |
| | 12.25 | 13,800 | |
| Sixth spring | 12.30 | 18,000 | |
| | 12.25 | 18,550 | |
| | 9.75 | 45,950 | |
| | 9.68 | 47,800 | Closed down. |
| | 9.75 | 44,850 | |
| | 11.88 | 18,000 | |
| | 12.25 | 13,900 | |
| | 10.25 | 38,500 | |

Loaded 100 times, compressing to 10″.25 and returning to 12″.25 height each time. Spring now closed down and so remained for a period of 16 hours, after which the results were as follows:

| | | |
|---|---|---|
| 9.70 | 45,080 | |
| 9.75 | 44,040 | |
| 11.80 | 18,000 | |
| 12.25 | 13,300 | |
| 11.87 | 18,000 | |
| 9.75 | 45,000 | |
| 11.80 | 18,000 | |
| 12.25 | 13,300 | |
| 10.25 | 38,100 | |
| 11.83 | 18,000 | |
| 12.25 | 13,200 | |

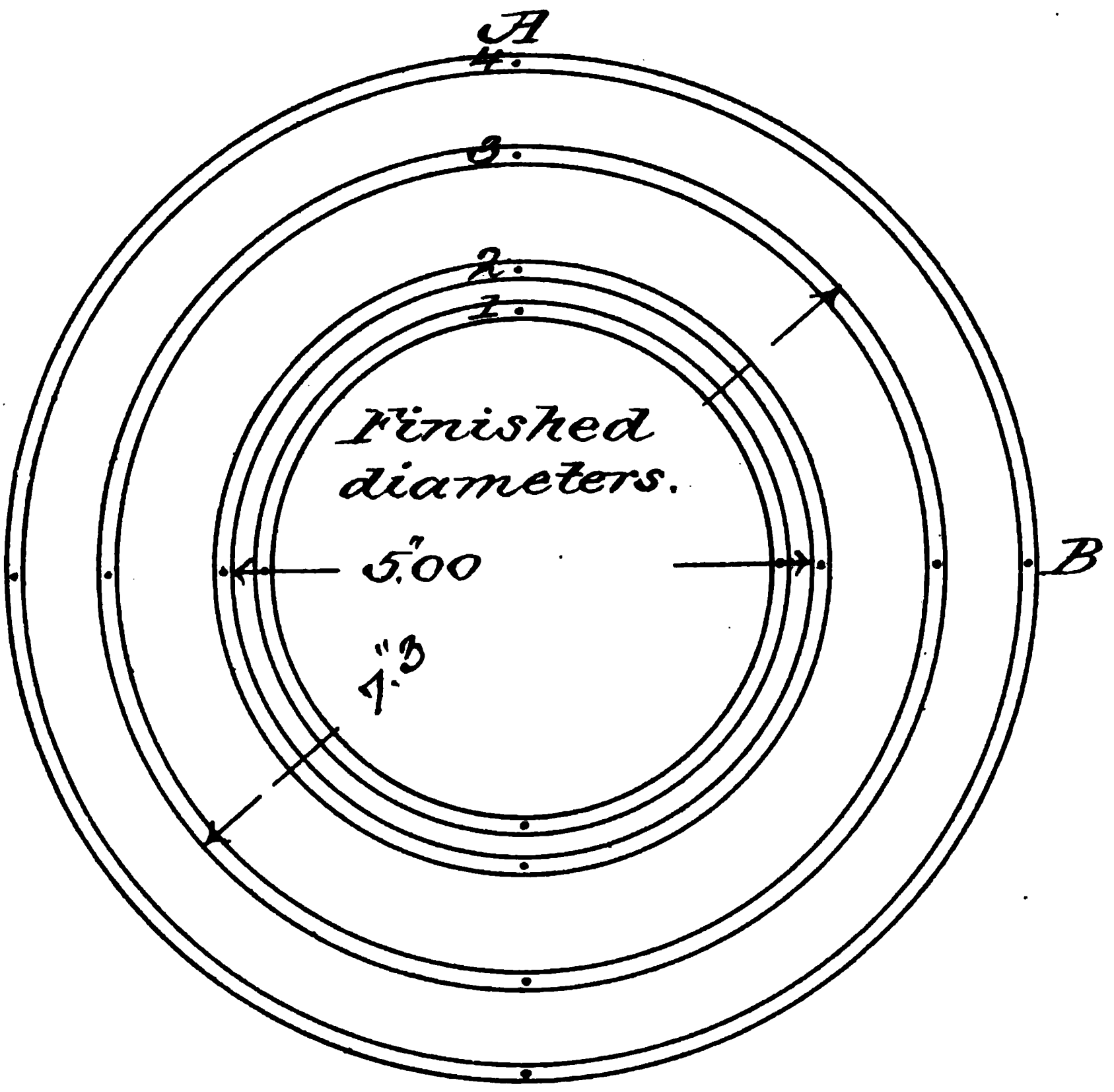
# INTERNAL STRAINS IN GUN FORGINGS.

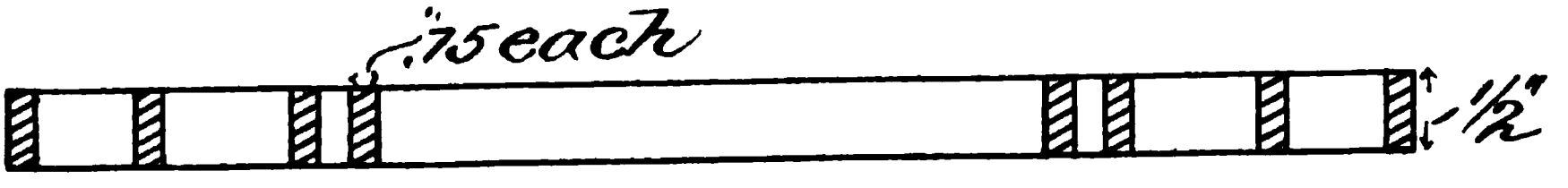
# 5-inch R.F. Gun Tubes.
## Breech Slices.



# 5-inch R. F. Gun Tubes.

## Muzzle Slices.



## INTERNAL STRAINS IN GUN FORGINGS.

Internal strains were introduced by heating the forgings and cooling the same rapidly by quenching from the bore.

These determinations were made upon the metal from the tubes of 5-inch R. F. guns.

The initial temperatures of the tubes at the time of quenching, with the rate of flow of the water through the bore at the time of quenching, are given in the following table, together with the initial strains of compression next the bore at both the breech and muzzle ends of the forging.

The temperature of the water used was about 55° F.

| No. of tube. | Temperature. | Rate of flow of water per minute. | Compressive stress next the bore per square inch. | | Remarks. |
|---|---|---|---|---|---|
| | | | Breech end. | Muzzle end. | |
| | °F. | *Gallons.* | *Pounds.* | *Pounds.* | |
| 11226 $B_1$ | 850 B, 900 M | | 24,300 | 26,200 | Third treatment. |
| 11226 $B_1$ | | | 25,700 | 29,200 | Fourth treatment. |
| 11226 $B_2$ | 850 B, 900 M | | 30,400 | 32,700 | Third treatment. |
| 11249 $B_2$ | | | 33,200 | 31,100 | |
| 11272 $B_3$ | | | 33,000 | 32,500 | |
| 11272 $B_4$ | | | | 30,200 | Muzzle crop end after annealing at 360° F. |
| 11293 $B_1$ | | | 35,900 | 32,800 | |
| 11293 $B_2$ | | | 36,400 | 32,500 | |
| 11293 $B_2$ | | | | 24,400 | Do. |
| 11293 $B_3$ | | | 31,000 | 28,900 | |
| 11363 $B_2$ | | | 32,600 | 33,900 | |
| 11467 $B_3$ | | | 36,800 | 31,300 | |
| 11467 $B_3$ | | | 34,200 | 35,200 | |
| 11775 $B_3$ | 850 B, 900 M | | 27,700 | 27,800 | |
| 11775 $B_3$ | | | 26,700 | 33,600 | Second treatment. |
| 11775 $B_3$ | | | 29,300 | 29,600 | |
| 11775 $B_4$ | | | 28,900 | 31,400 | |
| 11775 $B_4$ | | | 32,400 | 27,600 | |
| 11784 $B_2$ S 21 | | | 29,200 | 29,000 | Usual discard of 1¼". |
| 11784 $B_2$ S 10 | | | 32,000 | 23,400 | Discard, ¼". |
| 11784 $B_3$ | | | 30,400 | 29,800 | |
| 11791 $B_3$ | | | 32,400 | 28,000 | |
| 11794 $B_3$ | | | 38,400 | 31,800 | |
| 11837 $B_2$ | | | 29,500 | 25,200 | |
| 11837 $B_2$ | | | 31,700 | 29,000 | |
| 12485 $B_7$ | | | 30,500 | 29,900 | |
| 12485 $B_7$ | | | 26,500 | 26,500 | Muzzle crop end after annealing at 360° F. |
| 15021 $B_6$ | | | 32,300 | 30,400 | |
| 15021 $B_6$ | | | 36,800 | 25,600 | Second treatment. |
| 15021 $B_6$ | | | 39,200 | 32,000 | |

## TUBE 11226 $B_1$.

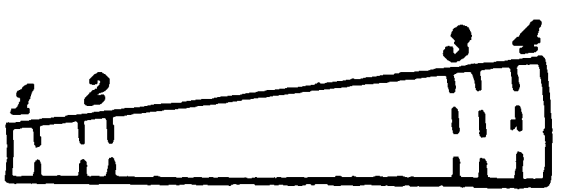
## (Third treatment.)

## BREECH SLICE.

State of internal strains and stresses at different phases of the slice.

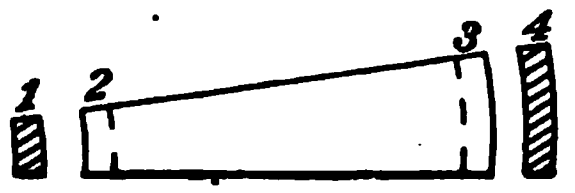
### SLICE INTACT.

Interior diameter of slice, 4″.76. Exterior diameter, 10″.47.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.92965 | ..... | .0040 | ..... | 24,300 |
| 2 | 5.6512 | ..... | .0020 | ..... | 10,600 |
| 3 | 9.64785 | .00185 | ..... | 5,800 | ..... |
| 4 | 10.29615 | ..... | .00015 | ..... | 440 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.93365 | ..... | ..... | ..... | ..... |
| 2 | 5.65005 | ..... | .00315 | ..... | 16,700 |
| 3 | 9.6470 | .0010 | ..... | 8,100 | ..... |
| 4 detached | 10.2963 | ..... | ..... | ..... | ..... |

### RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.6532 | ..... | ..... | ..... | ..... |
| 3 detached | 9.6460 | ..... | ..... | ..... | ..... |

## Breech Slice.

Interior diameters, 4″.76. Exterior diameter, 10″.47.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches* | *Inches.* | *Inches.* |
| 1 | 4.9298 | 4.9295 | 4.92965 |
| 2 | 5.6485 | 5.6539 | 5.6512 |
| 3 | 9.6488 | 9.6469 | 9.64785 |
| 4 | 10.2999 | 10.2924 | 10.29615 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.9344 | 4.9329 | 4.93365 |
| 2 | 5.6474 | 5.6527 | 5.65005 |
| 3 | 9.6479 | 9.6461 | 9.6470 |
| 4 detached | 10.3076 | 10.2850 | 10.2963 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6509 | 5.6555 | 5.6532 |
| 3 detached | 9.6454 | 9.6466 | 9.6460 |

Breech strains released.

| Rings. | Diameters. | | Mean. |
|---|---|---|---|
| | A. | B. | |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0046 | +.0034 | +.0040 |
| 2 in slice | −.0011 | −.0012 | −.00115 |
| 3 in slice | −.0009 | −.0008 | −.00085 |
| 4 detached | | | |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0035 | +.0028 | +.00315 |
| 3 detached | −.0025 | +.0005 | −.0010 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0024 | +.0016 | +.0020 |
| 3 detached | −.0034 | −.0003 | −.00185 |

## TUBE 11226 $B_1$.

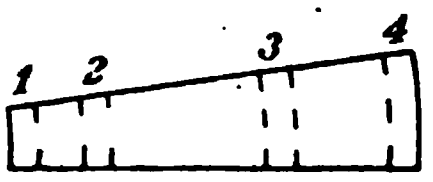
## (Third treatment.)

## MUZZLE SLICE.

State of internal strains and stresses at different phases of the slice.

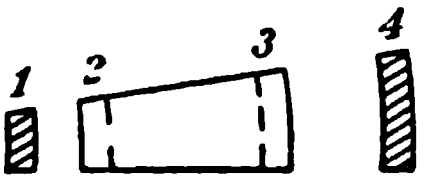
### SLICE INTACT.

Interior diameter of slice, 4″.26. Exterior diameter, 8″.62.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.41135 | ..... | .00385 | ..... | 26,200 |
| 2 | 5.1509 | ..... | .00145 | ..... | 8,400 |
| 3 | 7.1514 | .0021 | ..... | 8,800 | ..... |
| 4 | 8.44125 | .00325 | ..... | 11,500 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.4152 | ..... | ..... | ..... | ..... |
| 2 | 5.15065 | ..... | .0017 | ..... | 9,900 |
| 3 | 7.1514 | .0021 | ..... | 8,800 | ..... |
| 4 detached | 8.4380 | ..... | ..... | ..... | ..... |

### RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.15235 | ..... | ..... | ..... | ..... |
| 3 | 7.1493 | ..... | ..... | ..... | ..... |

## Muzzle Slice.

Interior diameter, 4″.26. Exterior diameter, 8″.62.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.4130 | 4.4097 | 4.41135 |
| 2 | 5.1478 | 5.1540 | 5.1509 |
| 3 | 7.1514 | 7.1514 | 7.1514 |
| 4 | 8.4424 | 8.4401 | 8.44125 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.4174 | 4.4130 | 4.4152 |
| 2 detached | 5.1476 | 5.1537 | 5.15065 |
| 3 detached | 7.1514 | 7.1514 | 7.1514 |
| 4 detached | 8.4336 | 8.4424 | 8.4380 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1488 | 5.1559 | 5.15235 |
| 3 detached | 7.1497 | 7.1489 | 7.1493 |

Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0044 | +.0033 | +.00385 |
| 2 in slice | .0002 | −.0003 | −.00025 |
| 3 in slice | .0000 | .0000 | .0000 |
| 4 detached | −.0088 | +.0023 | −.00325 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0012 | +.0022 | +.0017 |
| 3 detached | −.0017 | −.0025 | −.0021 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0010 | +.0019 | +.00145 |
| 3 detached | −.0017 | −.0025 | −.0021 |

## TUBE 11226 $B_1$.

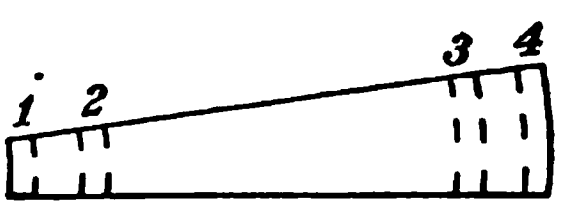
## (Fourth treatment.)

## BREECH SLICE.

State of internal strains and stresses at different phases of the slice.

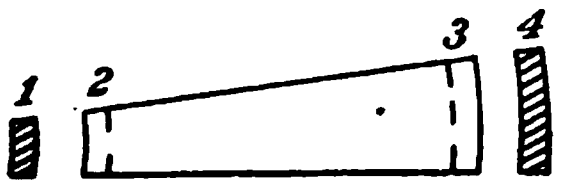
### SLICE INTACT.

Interior diameter of slice, 4″.76. Exterior diameter, 10″.46.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.90015 | ..... | .0042 | ..... | 25,700 |
| 2 | 5.6554 | ..... | .0031 | ..... | 16,400 |
| 3 | 9.64335 | .0030 | ..... | 9,300 | ..... |
| 4 | 10.3120 | .0017 | ..... | 13,700 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.90435 | ..... | ..... | ..... | ..... |
| 2 | 5.6544 | ..... | .0041 | ..... | 21,700 |
| 3 | 9.6426 | .00225 | ..... | 7,000 | ..... |
| 4 detached | 10.3073 | ..... | ..... | ..... | ..... |

### RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.6585 | ..... | ..... | ..... | ..... |
| 3 detached | 9.64035 | ..... | ..... | ..... | ..... |

## Breech Slice.

Interior diameter, 4″.76. Exterior diameter, 10″.46.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.9049 | 4.8954 | 4.90015 |
| 2 | 5.6509 | 5.6599 | 5.6554 |
| 3 | 9.6465 | 9.6402 | 9.64335 |
| 4 | 10.3134 | 10.3106 | 10.3120 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.9088 | 4.8999 | 4.90435 |
| 2 | 5.6500 | 5.6588 | 5.6544 |
| 3 | 9.6460 | 9.6392 | 9.6426 |
| 4 detached | 10.3106 | 10.3040 | 10.3073 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6535 | 5.6635 | 5.6585 |
| 3 detached | 9.6435 | 9.6372 | 9.64035 |

Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0039 | +.0045 | +.0042 |
| 2 in slice | −.0009 | −.0011 | −.0010 |
| 3 in slice | −.0005 | −.0010 | −.00075 |
| 4 detached | −.0028 | −.0066 | −.0047 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0035 | +.0047 | +.0041 |
| 3 detached | −.0025 | −.0020 | −.00225 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0026 | +.0036 | +.0031 |
| 3 detached | −.0030 | −.0090 | −.0030 |

## TUBE 11226 $B_1$.

### (Fourth treatment.)

### MUZZLE SLICE.

The bore was eccentric with the outside diameter of the slice. At maximum and minimum places the thickness of the metal was 2″.79 and 2″.43, respectively.

Rings were laid off concentric with the bore, ring 4 being ″.15 wide at the thinnest part, and ″.50 wide at the thickest.

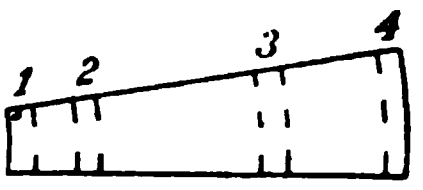
A fire crack existed in this slice at the circumference, penetrating to a depth of $\frac{1}{8}$″, and extending longitudinally the length of the slice, $\frac{1}{2}$″.

### MUZZLE SLICE.

State of internal strains and tresses at different phases of the slice.

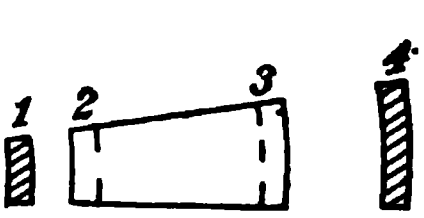
SLICE I ACT.

Interior diameter of slice, 4″.25. Exterior diameter, 9″.47.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.41025 | ..... | .0043 | ..... | 29,200 |
| 2 | 5.1441 | ..... | .0016 | ..... | 9,300 |
| 3 | 7.14775 | .0008 | ..... | 3,400 | ..... |
| 4 | 8.9837 | .00375 | ..... | 12,500 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″. Exterior diameter, 7″.30.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.41455 | ..... | ..... | ..... | ..... |
| 2 | 5.14355 | ..... | .00215 | ..... | 12,500 |
| 3 | 7.14765 | .0007 | ..... | 2,900 | ..... |
| 4 detached | 8.97995 | ..... | ..... | ..... | ..... |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.1457 | ..... | ..... | ..... | ..... |
| 3 detached | 7.14695 | ..... | ..... | ..... | ..... |

## MUZZLE SLICE.

Interior diameter, 4″.25. Exterior diameter, 9″.47.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.4097 | 4.4108 | 4.41025 |
| 2 | 5.1480 | 5.1402 | 5.1441 |
| 3 | 7.1452 | 7.1503 | 7.14775 |
| 4 | 8.9887 | 8.9787 | 8.9837 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.4138 | 4.4153 | 4.41455 |
| 2 | 5.1476 | 5.1395 | 5.14355 |
| 3 | 7.1451 | 7.1502 | 7.14765 |
| 4 detached | 8.9815 | 8.9784 | 8.97995 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1503 | 5.1411 | 5.1457 |
| 3 detached | 7.1442 | 7.1497 | 7.14695 |

Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0041 | +.0045 | +.0043 |
| 2 in slice | −.0004 | −.0007 | −.00055 |
| 3 in slice | −.0001 | −.0001 | −.0001 |
| 4 detached | −.0072 | −.0003 | −.00375 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0027 | +.0016 | +.00215 |
| 3 detached | −.0009 | −.0005 | −.0007 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0023 | +.0009 | +.0016 |
| 3 detached | −.0010 | −.0006 | −.0008 |

## TUBE 11226 $B_2$.

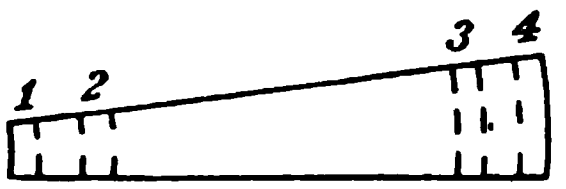
## (Third treatment.)

## BREECH SLICE.

State of internal strains and stresses at different phases of the slice.

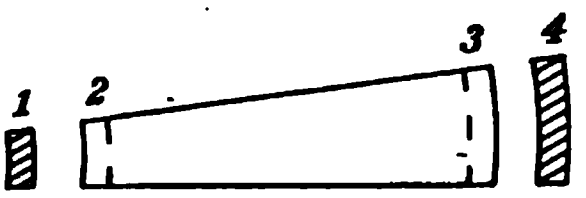
### SLICE INTACT.

Interior diameter of slice, 4″.77. Exterior diameter, 10″.50.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.93045 | ..... | .0050 | ..... | 30,400 |
| 2 | 5.6393 | ..... | .00385 | ..... | 20,500 |
| 3 | 9.64155 | .00435 | ..... | 13,500 | ..... |
| 4 | 10.3400 | .0020 | ..... | 5,800 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.93545 | ..... | ..... | ..... | ..... |
| 2 | 5.6381 | ..... | .00505 | ..... | 26,900 |
| 3 | 9.6409 | .0087 | ..... | 11,500 | ..... |
| 4 detached | 10.3380 | ..... | ..... | ..... | ..... |

### RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.64315 | ..... | ..... | ..... | ..... |
| 3 detached | 9.6372 | ..... | ..... | ..... | ..... |

## Breech Slice.

Interior diameter, 4″.77. Exterior diameter, 10″.50.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.9289 | 4.9320 | 4.93045 |
| 2 | 5.6375 | 5.6411 | 5.6393 |
| 3 | 9.6439 | 9.6392 | 9.64155 |
| 4 | 10.3414 | 10.3386 | 10.3400 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.9341 | 4.9368 | 4.93545 |
| 2 | 5.6361 | 5.6401 | 5.6381 |
| 3 | 9.6429 | 9.6389 | 9.6409 |
| 4 detached | 10.3474 | 10.3286 | 10.3380 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6428 | 5.6435 | 5.64315 |
| 3 detached | 9.6396 | 9.6348 | 9.6372 |

Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0052 | +.0048 | +.0050 |
| 2 in slice | −.0014 | −.0010 | −.0012 |
| 2 in slice | −.0010 | −.0003 | −.00065 |
| 4 detached | +.0060 | −.0100 | −.0020 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0067 | +.0034 | +.00505 |
| 3 detached | −.0033 | −.0041 | −.0037 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0053 | +.0024 | +.00385 |
| 3 detached | −.0043 | −.0044 | −.00435 |

## TUBE 11226 $B_2$.

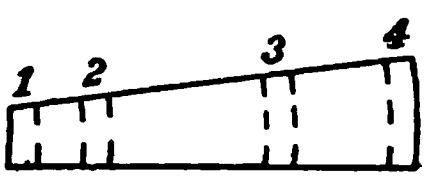
### (Third treatment.)

### MUZZLE SLICE.

State of internal strains and stresses at different phases of the slice.

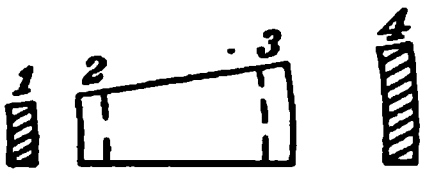
#### SLICE INTACT.

Interior diameter of slice, 4″.26. Exterior diameter, 8″.57.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.40585 | ..... | .0048 | ..... | 32,700 |
| 2 | 5.13875 | ..... | .0009 | ..... | 5,300 |
| 3 | 7.1451 | .00245 | ..... | 10,300 | ..... |
| 4 | 8.4147 | .00025 | ..... | 890 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.41065 | ..... | ..... | ..... | ..... |
| 2 | 5.1379 | ..... | .00175 | ..... | 10,200 |
| 3 | 7.1443 | .00165 | ..... | 6,900 | ..... |
| 4 detached | 8.41445 | ..... | ..... | ..... | ..... |

#### RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.13965 | ..... | ..... | ..... | ..... |
| 3 detached | 7.14265 | ..... | ..... | ..... | ..... |

## Muzzle Slice.

Interior diameter, 4″.26. Exterior diameter. 8″.57.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.4082 | 4.4035 | 4.40585 |
| 2 | 5.1419 | 5.1356 | 5.13875 |
| 3 | 7.1473 | 7.1429 | 7.1451 |
| 4 | 8.4135 | 8.4159 | 8.4147 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.4131 | 4.4082 | 4.41065 |
| 2 | 5.1409 | 5.1349 | 5.1379 |
| 3 | 7.1461 | 7.1425 | 7.1443 |
| 4 detached | 8.4164 | 8.4125 | 8.41445 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1419 | 5.1374 | 5.13965 |
| 3 detached | 7.1445 | 7.1408 | 7.14265 |

## Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0049 | +.0047 | +.0048 |
| 2 in slice | −.0010 | −.0007 | −.00085 |
| 3 in slice | −.0012 | −.0004 | −.0008 |
| 4 detached | +.0029 | −.0084 | −.00025 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0010 | +.0025 | +.00175 |
| 3 detached | −.0016 | −.0017 | −.00165 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | .0000 | +.0018 | +.0009 |
| 3 detached | −.0028 | −.0021 | −.00245 |

## Tube 11249 $B_2$.

### Breech Slice.

### State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.77. Exterior diameter, 10″.36.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.9200 | ..... | .00545 | ..... | 33,200 |
| 2 | 5.6499 | ..... | .0026 | ..... | 13,800 |
| 3 | 9.64305 | .0030 | ..... | 9,300 | ..... |
| 4 | ..... | ..... | ..... | ..... | ..... |

NOTE.—A longitudinal seam extends through the length of this slice at the exterior, penetrating to a depth of ″.06 at one face and ″.35 at the other face.

Measurements on ring 4 not taken, as the seam nearly separated this ring. It extended at the deepest place into ring 3.

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.92545 | | | | |
| 2 | 5.6487 | | .0088 | | 20,200 |
| 3 | 9.64165 | .0016 | | 5,000 | |
| 4 detached | | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.6525 | | | | |
| 3 detached | 9.64005 | | | | |

## Breech Slice.

Interior diameter, 4″.77. Exterior diameter, 10″.36.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.9215 | 4.9185 | 4.9200 |
| 2 | 5.6503 | 5.6495 | 5.6499 |
| 3 | 9.6445 | 9.6416 | 9.64305 |
| 4 | | | |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.9266 | 4.9243 | 4.92545 |
| 2 | 5.6493 | 5.6481 | 5.6487 |
| 3 | 9.6431 | 9.6402 | 9.64165 |
| 4 detached | | | |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6527 | 5.6523 | 5.6525 |
| 3 detached | 9.6389 | 9.6412 | 9.64005 |

## Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0051 | +.0058 | +.00545 |
| 2 in slice | −.0010 | −.0014 | −.0012 |
| 3 in slice | −.0014 | −.0014 | −.0014 |
| 4 detached | | | |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0064 | +.0042 | +.0088 |
| 3 detached | −.0042 | +.0010 | −.0016 |

FIRST TO THIRD PHASE,

| | | | |
|---|---|---|---|
| 2 detached | +.0024 | +.0028 | +.0026 |
| 3 detached | −.0056 | −.0004 | −.0030 |

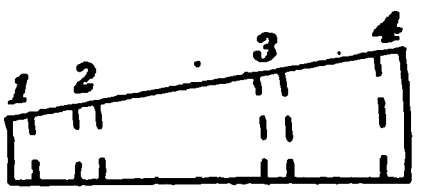
## Tube 11249 $B_2$.

### Muzzle Slice.

State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.22. Exterior diameter, 8″.50.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.34555 | | .0045 | | 31,100 |
| 2 | 5.15235 | .0001 | | 600 | |
| 3 | 7.1519 | .0018 | | 7,500 | |
| 4 | 8.37295 | .00265 | | 9,500 | |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.35005 | | | | |
| 2 | 5.1516 | | .00065 | | 3,800 |
| 3 | 7.15095 | .00085 | | 3,500 | |
| 4 detached | 8.3703 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.15225 | | | | |
| 3 detached | 7.1501 | | | | |

## Muzzle Slice.

Interior diameter, 4″.22. Exterior diameter, 8″.50.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.3486 | 4.3425 | 4.34555 |
| 2 | 5.1523 | 5.1524 | 5.15235 |
| 3 | 7.1534 | 7.1504 | 7.1519 |
| 4 | 8.3724 | 8.3735 | 8.37295 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.3530 | 4.3471 | 4.35005 |
| 2 | 5.1518 | 5.1514 | 5.1516 |
| 3 | 7.1527 | 7.1492 | 7.15095 |
| 4 detached | 8.3687 | 8.3719 | 8.3703 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1517 | 5.1528 | 5 15225 |
| 3 detached | 7.1515 | 7.1487 | 7.1501 |

## Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0044 | +.0046 | +.0045 |
| 2 in slice | −.0005 | −.0010 | −.00075 |
| 3 in slice | −.0007 | −.0012 | −.00095 |
| 4 detached | −.0037 | −.0016 | −.00265 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | −.0001 | +.0014 | +.00065 |
| 3 detached | −.0012 | −.0005 | −.00085 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | −.0006 | +.0004 | −.0001 |
| 3 detached | −.0019 | −.0017 | −.0018 |

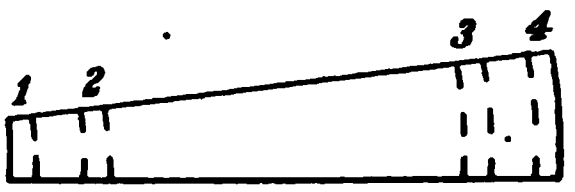
## Tube 11272 $B_3$.

## Breech Slice.

State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.72. Exterior diameter, 10″.44.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.8667 | ..... | .00535 | ..... | 33,000 |
| 2 | 5.64815 | ..... | .0027 | ..... | 14,300 |
| 3 | 9.6472 | .00445 | ..... | 13,800 | ..... |
| 4 | 10.2805 | ..... | .00115 | ..... | 3,400 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.87206 | | | | |
| 2 | 5.64685 | | .0040 | | 21,200 |
| 3 | 9.6462 | .00345 | | 10,700 | |
| 4 detached | 10.28165 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.65085 | | | | |
| 3 detached | 9.64275 | | | | |

## Breech Slice.

Interior diameter, 4″.72. Exterior diameter, 10″.44.
Original diameter of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.8654 | 4.8680 | 4.8667 |
| 2 | 5.6499 | 5.6464 | 5.64815 |
| 3 | 9.6479 | 9.6465 | 9.6472 |
| 4 | 10.2779 | 10.2831 | 10.2805 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.8705 | 4.8736 | 4.87205 |
| 2 | 5.6485 | 5.6452 | 5.64685 |
| 3 | 9.6469 | 9.6455 | 9.6462 |
| 4 detached | 10.2779 | 10.2854 | 10.28165 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6534 | 5.6483 | 5.65085 |
| 3 detached | 9.6424 | 9.6481 | 9.64275 |

## Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0051 | +.0056 | +.00535 |
| 2 in slice | −.0014 | −.0012 | −.0013 |
| 3 in slice | −.0010 | −.0010 | −.0010 |
| 4 detached | −.0000 | −.0023 | +.00115 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0049 | +.0031 | +.0040 |
| 3 detached | −.0045 | −.0024 | −.00345 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0085 | +.0019 | +.0027 |
| 3 detached | −.0055 | −.0084 | −.00445 |

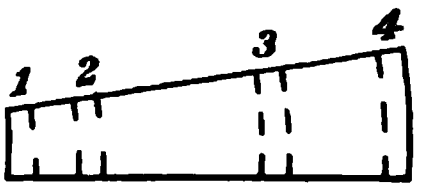
## Tube 11272 $B_3$.

### Muzzle Slice.

### State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.27. Exterior diameter, 8″.93.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.42525 | ..... | .0048 | ..... | 32,500 |
| 2 | 5.1502 | ..... | .00245 | ..... | 14,200 |
| 3 | 7.1433 | .0025 | ..... | 10,500 | ..... |
| 4 | 8.79575 | .0060 | ..... | 20,500 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.43005 | | | | |
| 2 | 5.14975 | | .0029 | | 16,900 |
| 3 | 7.14305 | .00225 | | 9,400 | |
| 4 detached | 8.78975 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.15265 | | | | |
| 3 detached | 7.1408 | | | | |

## Muzzle Slice.

Interior diameter, 4″.27. Exterior diameter, 8″.93.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.4243 | 4.4262 | 4.42525 |
| 2 | 5.1513 | 5.1491 | 5.1502 |
| 3 | 7.1435 | 7.1431 | 7.1433 |
| 4 | 8.7941 | 8.7974 | 8.79575 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.4290 | 4.4311 | 4.43005 |
| 2 | 5.1509 | 5.1486 | 5.14975 |
| 3 | 7.1432 | 7.1429 | 7.14305 |
| 4 detached | 8.7940 | 8.7855 | 8.78975 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1534 | 5.1519 | 5.15265 |
| 3 detached | 7.1416 | 7.1400 | 7.1408 |

## Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0047 | +.0049 | +.0048 |
| 2 in slice | −.0004 | −.0005 | −.00045 |
| 3 in slice | −.0003 | −.0002 | −.00025 |
| 4 detached | −.0001 | −.0119 | −.0060 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0025 | +.0033 | +.0029 |
| 3 detached | −.0016 | −.0029 | −.00225 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0021 | +.0028 | +.00245 |
| 3 detached | −.0019 | −.0031 | −.0025 |

## Tube 11272 $B_3$.

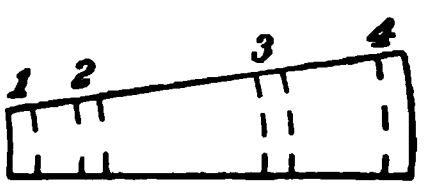
Muzzle crop end of tube after annealing at 360° F.

### Muzzle Slice.

State of internal strains and stresses at different phases of the slice.

#### SLICE INTACT.

Interior diameter of slice, 4″.26. Exterior diameter, 8″.95.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.41615 | ..... | .00445 | ..... | 30,200 |
| 2 | 5.15055 | ..... | .0028 | ..... | 16,300 |
| 3 | 7.15425 | .00155 | ..... | 6,400 | ..... |
| 4 | 8.7893 | .00445 | ..... | 15,200 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.4206 | | | | |
| 2 | 5.1509 | | .00245 | | 14,300 |
| 3 | 7.15425 | .00155 | | 6,500 | |
| 4 detached | 8.78485 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.15335 | | | | |
| 3 detached | 7.1527 | | | | |

## Muzzle Slice.

Interior diameter, 4″.26. Exterior diameter, 8″.95.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.4169 | 4.4154 | 4.41615 |
| 2 | 5.1519 | 5.1492 | 5.15055 |
| 3 | 7.1533 | 7.1552 | 7.15425 |
| 4 | 8.7864 | 8.7922 | 8.7893 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.4236 | 4.4176 | 4.4206 |
| 2 | 5.1526 | 5.1492 | 5.1509 |
| 3 | 7.1542 | 7.1543 | 7.15425 |
| 4 detached | 8.7689 | 8.8008 | 8.78485 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1553 | 5.1514 | 5.15335 |
| 3 detached | 7.1509 | 7.1545 | 7.1527 |

Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0067 | +.0022 | +.00445 |
| 2 in slice | +.0007 | .0000 | +.00035 |
| 3 in slice | +.0009 | −.0009 | .0000 |
| 4 detached | −.0175 | +.0086 | −.00445 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0027 | +.0022 | +.00245 |
| 3 detached | −.0033 | +.0002 | −.00155 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0034 | +.0022 | +.0028 |
| 3 detached | −.0021 | −.0007 | −.00155 |

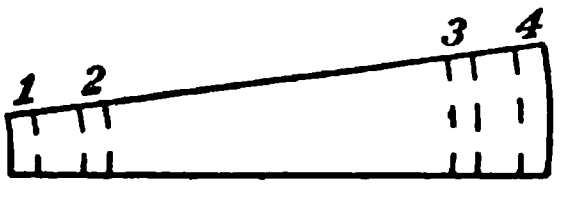
## Tube 11293 $B_1$.

## Breech Slice.

State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.74. Exterior diameter, 10″.44.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.88315 | ..... | .00585 | ..... | 35,900 |
| 2 | 5.65155 | ..... | .00155 | ..... | 8,200 |
| 3 | 9.64765 | .0028 | ..... | 8,700 | ..... |
| 4 | 10.27635 | ..... | .00125 | ..... | 3,600 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.8890 | | | | |
| 2 | 5.65025 | | .00285 | | 15,100 |
| 3 | 9.64665 | .0018 | | 5,500 | |
| 4 detached | 10.2776 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.6531 | | | | |
| 3 detached | 9.64485 | | | | |

## Breech Slice.

Interior diameter, 4″.74. Exterior diameter, 10″.44.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.8832 | 4.8831 | 4.88315 |
| 2 | 5.6505 | 5.6526 | 5.65155 |
| 3 | 9.6440 | 9.6513 | 9.64765 |
| 4 | 10.2781 | 10.2746 | 10.27635 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.8897 | 4.8883 | 4.8890 |
| 2 | 5.6492 | 5.6513 | 5.65025 |
| 3 | 9.6431 | 9.6502 | 9.64665 |
| 4 detached | 10.2814 | 10.2738 | 10.2776 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6514 | 5.6548 | 5.6531 |
| 3 detached | 9.6412 | 9.6485 | 9.64485 |

## Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | L. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0065 | +.0052 | +.00585 |
| 2 in slice | −.0013 | −.0013 | −.0013 |
| 3 in slice | −.0009 | −.0011 | −.0010 |
| 4 detached | +.0083 | −.0008 | +.00125 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0022 | +.0035 | +.00285 |
| 3 detached | −.0019 | −.0017 | −.0018 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | −.0009 | +.0022 | +.00155 |
| 3 detached | −.0028 | −.0028 | −.0028 |

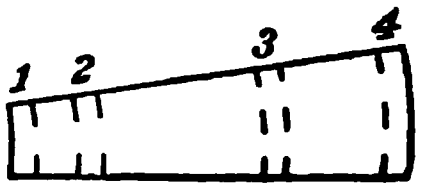
## Tube 11293 $B_1$.

## Muzzle Slice.

State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice; 4″.33. Exterior diameter, 8″.88.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.4853 | ..... | .0049 | ..... | 32,800 |
| 2 | 5.15445 | ..... | .00265 | ..... | 15,400 |
| 3 | 7.1471 | .00235 | ..... | 9,800 | ..... |
| 4 | 8.72025 | .00135 | ..... | 4,600 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.4902 | | | | |
| 2 | 5.15405 | | .00305 | | 17,700 |
| 3 | 7.14705 | .0023 | | 9,600 | |
| 4 detached | 8.7189 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.1571 | | | | |
| 3 detached | 7.14475 | | | | |

## Muzzle Slice.

Interior diameter, 4″.33. Exterior diameter, 8″.88.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.4839 | 4.4867 | 4.4853 |
| 2 | 5.1560 | 5.1529 | 5.15445 |
| 3 | 7.1462 | 7.1480 | 7.1471 |
| 4 | 8.7146 | 8.7259 | 8.72025 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.4891 | 4.4913 | 4.4902 |
| 2 | 5.1553 | 5.1528 | 5.15405 |
| 3 | 7.1457 | 7.1484 | 7.14705 |
| 4 detached | 8.7177 | 8.7201 | 8.7189 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1581 | 5.1561 | 5.1571 |
| 3 detached | 7.1440 | 7.1455 | 7.14475 |

## Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0052 | +.0046 | +.0049 |
| 2 in slice | −.0007 | −.0001 | −.0004 |
| 3 in slice | −.0005 | +.0004 | −.00005 |
| 4 detached | +.0031 | −.0058 | −.00135 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0028 | +.0033 | +.00305 |
| 3 detached | −.0017 | −.0029 | −.0023 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0021 | +.0032 | +.00265 |
| 3 detached | −.0022 | −.0025 | −.00235 |

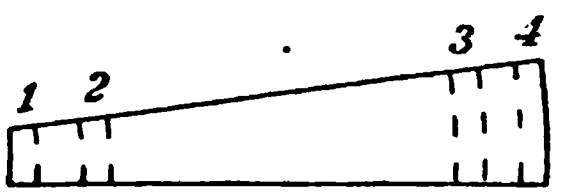
## Tube 11293 $B_2$.

### Breech Slice.

State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.74. Exterior diameter, 10″.44.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.8963 | ..... | .00595 | ..... | 36,400 |
| 2 | 5.6608 | ..... | .00155 | ..... | 8,200 |
| 3 | 9.6515 | .0032 | ..... | 9,900 | ..... |
| 4 | 10.27885 | .0014 | ..... | 4,000 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.90225 | | | | |
| 2 | 5.6595 | | .00285 | | 15,100 |
| 3 | 9.65045 | .00215 | | 6,700 | |
| 4 detached | 10.27745 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.6623 | | | | |
| 3 detached | 9.6483 | | | | |

## Breech Slice.

Interior diameter, 4″.74. Exterior diameter, 10″.44.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.8990 | 4.8936 | 4.8963 |
| 2 | 5.6623 | 5.6593 | 5.6608 |
| 3 | 9.6523 | 9.6507 | 9.6515 |
| 4 | 10.2802 | 10.2775 | 10.27885 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.9053 | 4.8992 | 4.90225 |
| 2 | 5.6610 | 5.6580 | 5.6595 |
| 3 | 9.6513 | 9.6496 | 9.65045 |
| 4 detached | 10.2809 | 10.2740 | 10.27745 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6633 | 5.6614 | 5.66285 |
| 3 detached | 9.6486 | 9.6480 | 9.6483 |

Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0063 | +.0050 | +.00595 |
| 2 in slice | −.0013 | −.0013 | −.0013 |
| 3 in slice | −.0010 | −.0011 | −.00105 |
| 4 detached | +.0007 | −.0035 | −.0014 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0023 | +.0034 | +.00285 |
| 3 detached | −.0027 | −.0016 | −.00215 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0010 | +.0021 | +.00155 |
| 3 detached | −.0037 | −.0027 | −.0032 |

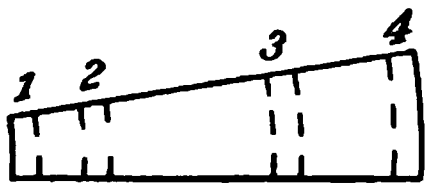
## TUBE 11293 $B_2$.

## MUZZLE SLICE.

State of internal strains and stresses at different phases of the slice.

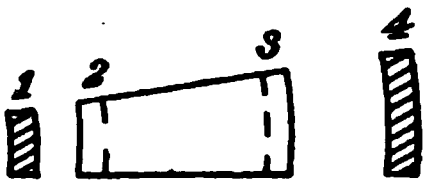
### SLICE INTACT.

Interior diameter of slice, 4″.27. Exterior diameter, 8″.64.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.4304 | ..... | .0048 | ..... | 32,500 |
| 2 | 5.1380 | ..... | .00155 | ..... | 9,100 |
| 3 | 7.1403 | .0025 | ..... | 10,500 | ..... |
| 4 | 8.45035 | .00255 | ..... | 9,000 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.4352 | ..... | ..... | ..... | ..... |
| 2 | 5.1368 | ..... | .00275 | ..... | 16,100 |
| 3 | 7.1398 | .0020 | ..... | 8,400 | ..... |
| 4 detached | 8.4478 | ..... | ..... | ..... | ..... |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.13955 | ..... | ..... | ..... | ..... |
| 3 detached | 7.1378 | ..... | ..... | ..... | ..... |

## MUZZLE SLICE.

Interior diameter, 4″.27. Exterior diameter, 8″.64.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.4313 | 4.4295 | 4.4304 |
| 2 | 5.1395 | 5.1365 | 5.1380 |
| 3 | 7.1394 | 7.1412 | 7.1403 |
| 4 | 8.4538 | 8.4469 | 8.45085 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.4365 | 4.4339 | 4.4352 |
| 2 | 5.1385 | 5.1351 | 5.1368 |
| 3 | 7.1390 | 7.1406 | 7.1398 |
| 4 detached | 8.4459 | 8.4497 | 8.4478 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1413 | 5.1378 | 5.13955 |
| 3 detached | 7.1356 | 7.1400 | 7.1378 |

## Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0052 | +.0044 | +.0048 |
| 2 in slice | −.0010 | −.0014 | −.0012 |
| 3 in slice | −.0004 | −.0006 | −.0005 |
| 4 detached | −.0079 | +.0028 | −.00255 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0028 | +.0027 | +.00275 |
| 3 detached | −.0034 | −.0006 | −.0020 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0018 | +.0013 | +.00155 |
| 3 detached | −.0038 | −.0012 | −.0025 |

### TUBE 11293 $B_2$.

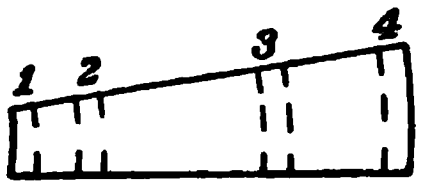
Muzzle crop end of tube after annealing at 360° F.

### MUZZLE SLICE.

State of internal strains and stresses at different phases of the slice.

### SLICE INTACT.

Interior diameter of slice, 4″.27. Exterior diameter, 8″.64.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.42175 | ..... | .0036 | ..... | 24,400 |
| 2 | 5.1441 | ..... | .00115 | ..... | 6,700 |
| 3 | 7.1444 | .0015 | ..... | 6,800 | ..... |
| 4 | 8.4653 | .00045 | ..... | 1,600 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.42535 | | | | |
| 2 detached | 5.1431 | | .00215 | | 12,500 |
| 3 detached | 7.14365 | .00075 | | 3,100 | |
| 4 detached | 8.46485 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.14525 | | | | |
| 3 detached | 7.1429 | | | | |

## Muzzle Slice.

Interior diameter, 4″.27. Exterior diameter, 8″.64.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.4220 | 4.4215 | 4.42175 |
| 2 | 5.1466 | 5.1416 | 5.1441 |
| 3 | 7.1469 | 7.1419 | 7.1444 |
| 4 | 8.4639 | 8.4667 | 8.4653 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.4255 | 4.4252 | 4.42535 |
| 2 | 5.1459 | 5.1403 | 5.1431 |
| 3 | 7.1463 | 7.1410 | 7.14365 |
| 4 detached | 8.4524 | 8.4778 | 8.46485 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1483 | 5.1422 | 5.14525 |
| 3 detached | 7.1459 | 7.1399 | 7.1429 |

## Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0035 | +.0037 | +.0036 |
| 2 in slice | −.0007 | −.0013 | −.0010 |
| 3 in slice | −.0006 | −.0009 | −.00075 |
| 4 detached | −.0115 | +.0106 | −.00045 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0024 | +.0019 | +.00215 |
| 3 detached | −.0004 | −.0011 | −.00075 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0017 | +.0006 | +.00115 |
| 3 detached | −.0010 | −.0020 | −.0015 |

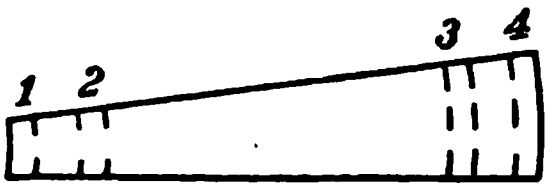
## TUBE 11293 $B_3$.

### BREECH SLICE.

State of internal strains and stresses at different phases of the slice.

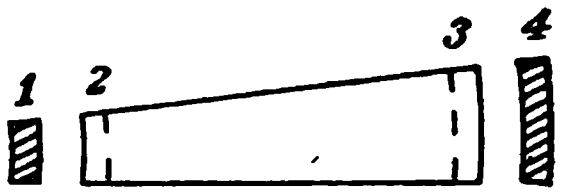
SLICE INTACT.

Interior diameter of slice, 4″.84. Exterior diameter, 10″.48.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.98165 | ..... | .00515 | ..... | 31,000 |
| 2 | 5.6526 | ..... | .00315 | ..... | 16,700 |
| 3 | 9.64535 | .0026 | ..... | 8,100 | ..... |
| 4 | 10.29185 | ..... | .0004 | ..... | 1,200 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.9868 | | | | |
| 2 | 5.6513 | | .00445 | | 23,600 |
| 3 | 9.6448 | .00206 | | 6,400 | |
| 4 detached | 10.29225 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.6557 | | | | |
| 3 detached | 9.64275 | | | | |

## Breech Slice.

Interior diameter, 4″.84. Exterior diameter, 10″.48.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.9823 | 4.9810 | 4.98165 |
| 2 | 5.6570 | 5.6482 | 5.6526 |
| 3 | 9.6435 | 9.6472 | 9.64535 |
| 4 | 10.2921 | 10.2916 | 10.29185 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.9883 | 4.9853 | 4.9868 |
| 2 | 5.6560 | 5.6466 | 5.6513 |
| 3 | 9.6432 | 9.6464 | 9.6448 |
| 4 detached | 10.2882 | 10.2963 | 10.29225 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6603 | 5.6512 | 5.65575 |
| 3 detached | 9.6420 | 9.6435 | 9.64275 |

## Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0060 | +.0043 | +.00515 |
| 2 in slice | −.0010 | −.0016 | −.0013 |
| 3 in slice | −.0003 | −.0008 | −.00055 |
| 4 detached | −.0039 | +.0047 | +.0004 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0043 | +.0046 | +.00445 |
| 3 detached | −.0012 | −.0029 | −.00205 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0033 | +.0030 | +.00315 |
| 3 detached | −.0015 | −.0037 | −.0026 |

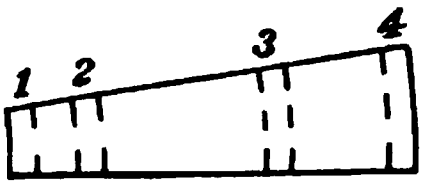
## Tube 11293 $B_3$.

### Muzzle Slice.

State of internal strains and stresses at different phases of the slice.

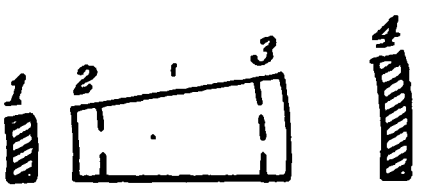
SLICE INTACT.

Interior diameter of slice, 4″.26. Exterior diameter, 8″.76.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.4094 | ..... | .00425 | ..... | 28,900 |
| 2 | 5.14405 | ..... | .0023 | ..... | 13,400 |
| 3 | 7.14625 | .0014 | ..... | 5,900 | ..... |
| 4 | 8.5693 | ..... | .00025 | ..... | 900 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inchcs.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.41365 | | | | |
| 2 | 5.1434 | | +.00295 | | 17,200 |
| 3 | 7.1458 | −.00095 | | 4,000 | |
| 4 detached | 8.56955 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.14635 | | | | |
| 3 detached | 7.14485 | | | | |

## Muzzle Slice.

Interior diameter, 4″.26. Exterior diameter, 8″.76.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.4072 | 4.4116 | 4.4094 |
| 2 | 5.1425 | 5.1456 | 5.14405 |
| 3 | 7.1450 | 7.1475 | 7.14625 |
| 4 | 8.5700 | 8.5686 | 8.5693 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.4111 | 4.4162 | 4.41365 |
| 2 | 5.1420 | 5.1448 | 5.1434 |
| 3 | 7.1447 | 7.1469 | 7.1458 |
| 4 detached | 8.5623 | 8.5768 | 8.56955 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1450 | 5.1477 | 5.14635 |
| 3 detached | 7.1419 | 7.1478 | 7.14485 |

Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0039 | +.0046 | +.00425 |
| 2 in slice | −.0005 | −.0008 | −.00065 |
| 3 in slice | −.0003 | −.0006 | −.00045 |
| 4 detached | −.0077 | +.0082 | +.00025 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0080 | +.0029 | +.00295 |
| 3 detached | −.0028 | +.0009 | −.00095 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0025 | +.0021 | +.0023 |
| 3 detached | −.0031 | +.0003 | −.0014 |

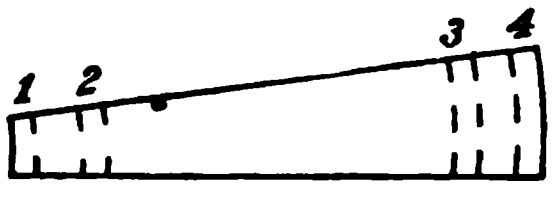
## TUBE 11363 $B_2$.

## BREECH SLICE.

State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.74. Exterior diameter, 10″.46.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.87695 | ..... | .0053 | ..... | 32,600 |
| 2 | 5.64655 | ..... | .0003 | ..... | 1,600 |
| 3 | 9.64585 | .0015 | ..... | 4,700 | ..... |
| 4 | 10.3025 | ..... | .0017 | ..... | 4,900 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.88225 | | | | |
| 2 | 5.64555 | | .0013 | | 6,900 |
| 3 | 9.6450 | .00065 | | 2,000 | |
| 4 detached | 10.30425 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.64685 | | | | |
| 3 detached | 9.64435 | | | | |

## Breech Slice.

Interior diameter, 4″.74. Exterior diameter, 10″.46.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.8768 | 4.8771 | 4.87695 |
| 2 | 5.6524 | 5.6407 | 5.64655 |
| 3 | 9.6467 | 9.6450 | 9.64585 |
| 4 | 10.2981 | 10.3070 | 10.30255 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.8816 | 4.8829 | 4.88225 |
| 2 | 5.6514 | 5.6397 | 5.64555 |
| 3 | 9.6459 | 9.6441 | 9.6450 |
| 4 detached | 10.2979 | 10.3106 | 10.30425 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6533 | 5.6404 | 5.64685 |
| 3 detached | 9.6454 | 9.6433 | 9.64435 |

## Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0048 | +.0058 | +.0053 |
| 2 in slice | −.0010 | −.0010 | −.0010 |
| 3 in slice | −.0008 | −.0009 | −.00085 |
| 4 detached | −.0002 | +.0036 | +.0017 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0019 | +.0007 | +.0013 |
| 3 detached | −.0005 | −.0008 | −.0015 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0009 | −.0003 | −.0003 |
| 3 detached | −.0013 | −.0017 | −.0015 |

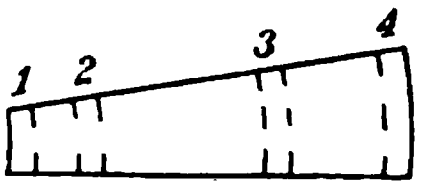
## Tube 11363 $B_2$.

## Muzzle Slice.

State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.23. Exterior diameter, 8″.63.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.3795 | ..... | .00495 | ..... | 33,900 |
| 2 | 5.1458 | ..... | .00215 | ..... | 12,500 |
| 3 | 7.1332 | .00265 | ..... | 11,100 | ..... |
| 4 | 8.3723 | .00375 | ..... | 13,400 | ..... |

Bore and exterior surface of this slice eccentric. Ring 4, maximum thickness, ″.24; minimum thickness, ″.15.

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.38445 | | | | |
| 2 | 5.14545 | | .0025 | | 14,500 |
| 3 | 7.1328 | .00225 | | 9,500 | |
| 4 detached | 8.36855 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.14795 | | | | |
| 3 detached | 7.13055 | | | | |

## Muzzle Slice.

Interior diameter, 4″.23. Exterior diameter, 8″.63.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.3805 | 4.3785 | 4.3795 |
| 2 | 5.1437 | 5.1479 | 5.1458 |
| 3 | 7.1375 | 7.1289 | 7.1332 |
| 4 | 8.3730 | 8.3716 | 8.3723 |

Rings 1 and 4 detached, rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.3858 | 4.3831 | 4.38445 |
| 2 | 5.1432 | 5.1477 | 5.14545 |
| 3 | 7.1373 | 7.1283 | 7.1328 |
| 4 detached | 8.3577 | 8.3794 | 8.36855 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1462 | 5.1497 | 5.14795 |
| 3 detached | 7.1363 | 7.1248 | 7.13055 |

Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0053 | +.0046 | +.00495 |
| 2 in slice | −.0005 | −.0002 | −.00035 |
| 3 in slice | −.0002 | −.0006 | −.0004 |
| 4 detached | −.0153 | +.0078 | −.00375 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0030 | +.0020 | +.0025 |
| 3 detached | −.0010 | −.0035 | −.00225 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0025 | +.0018 | +.00215 |
| 3 detached | −.0012 | −.0041 | −.00265 |

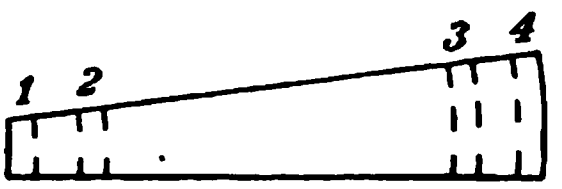
## TUBE 11467 $B_3$.

## BREECH SLICE.

State of internal strains and stresses at different phases of the slice.

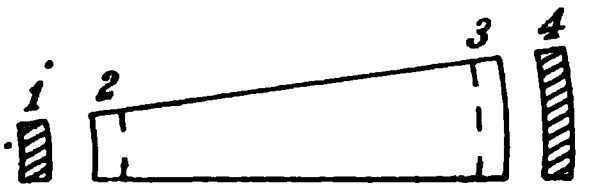
### SLICE INTACT.

Interior diameter of slice, 4″.74. Exterior diameter, 10″.46.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.8862 | ..... | .0060 | ..... | 36,800 |
| 2 | 5.64545 | ..... | .00105 | ..... | 5,600 |
| 3 | 9.6404 | .0027 | ..... | 8,400 | ..... |
| 4 | 10.3074 | .0021 | ..... | 6,100 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.8922 | | | | |
| 2 | 5.64385 | | .00265 | | 14,100 |
| 3 | 9.63935 | .00165 | | 5,100 | |
| 4 detached | 10.3053 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.6465 | | | | |
| 3 detached | 9.6377 | | | | |

## Breech Slice.

Interior diameter, 4″.74. Exterior diameter, 10″.46.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.8890 | 4.8834 | 4.8862 |
| 2 | 5.6441 | 5.6468 | 5.64545 |
| 3 | 9.6411 | 9.6397 | 9.6404 |
| 4 | 10.3123 | 10.3025 | 10.3074 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.8938 | 4.8906 | 4.8922 |
| 2 | 5.6425 | 5.6452 | 5.64385 |
| 3 | 9.6400 | 9.6387 | 9.63935 |
| 4 detached | 10.3118 | 10.2988 | 10.3053 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6459 | 5.6471 | 5.6465 |
| 3 detached | 9.6370 | 9.6384 | 9.6377 |

Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0048 | +.0072 | +.0060 |
| 2 in slice | −.0016 | −.0016 | −.0016 |
| 3 in slice | −.0011 | −.0010 | −.00105 |
| 4 detached | −.0005 | −.0037 | −.0021 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0034 | +.0019 | +.00265 |
| 3 detached | −.0090 | −.0003 | −.00165 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0018 | +.0003 | +.00105 |
| 3 detached | −.0041 | −.0013 | −.0027 |

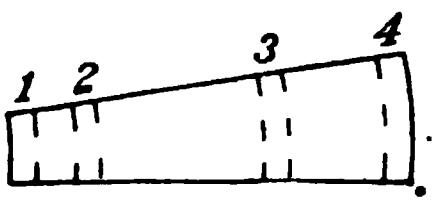
## TUBE 11467 $B_3$.

## MUZZLE SLICE.

State of internal strains and stresses at different phases of the slice.

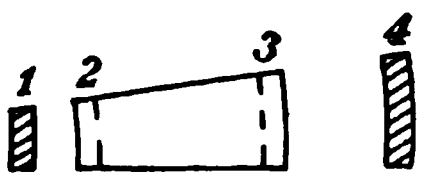
### SLICE INTACT.

Interior diameter of slice, 4″.22. Exterior diameter, 8″.57.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.35935 | ..... | .00455 | ..... | 31,300 |
| 2 | 5.1550 | ..... | .0028 | ..... | 16,300 |
| 3 | 7.14455 | .00315 | ..... | 13,200 | ..... |
| 4 | 8.40815 | .00445 | ..... | 15,900 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.3639 | | | | |
| 2 | 5.15445 | | .00335 | | 19,500 |
| 3 | 7.14445 | .00305 | | 12,800 | |
| 4 detached | 8.4037 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.1578 | | | | |
| 3 detached | 7.1414 | | | | |

## Muzzle Slice.

Interior diameter, 4″.22. Exterior diameter, 8″.57.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.3580 | 4.3607 | 4.35935 |
| 2 | 5.1502 | 5.1598 | 5.1550 |
| 3 | 7.1431 | 7.1460 | 7.14455 |
| 4 | 8.4085 | 8.4078 | 8.40815 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.3626 | 4.3652 | 4.3639 |
| 2 | 5.1498 | 5.1591 | 5.15445 |
| 3 | 7.1431 | 7.1458 | 7.14445 |
| 4 detached | 8.4064 | 8.4010 | 8.4037 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1581 | 5.1625 | 5.1578 |
| 3 detached | 7.1403 | 7.1425 | 7.1414 |

## Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0046 | +.0045 | +.00455 |
| 2 in slice | −.0004 | −.0007 | −.00055 |
| 3 in slice | .0000 | −.0002 | −.0001 |
| 4 detached | −.0021 | −.0068 | −.00445 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0033 | +.0034 | +.00335 |
| 3 detached | −.0028 | −.0033 | −.00305 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0029 | +.0027 | +.0028 |
| 3 detached | −.0028 | −.0035 | −.00315 |

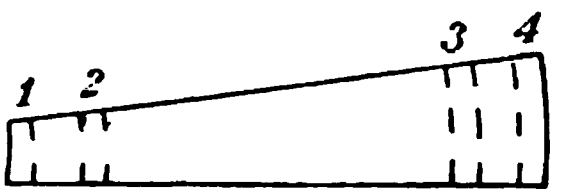
## Tube 11467 $B_3$.

### Breech Slice.

State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.74. Exterior diameter, 10″.47.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.8676 | ..... | .00555 | ..... | 31,200 |
| 2 | 5.6516 | ..... | .00185 | ..... | 9,800 |
| 3 | 9.6455 | .0035 | ..... | 10,900 | ..... |
| 4 | 10.31405 | .00205 | ..... | 6,000 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.87315 | | | | |
| 2 | 5.65085 | | .0031 | | 16,400 |
| 3 | 9.64495 | .00295 | | 9,100 | |
| 4 detached | 10.3120 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.65345 | | | | |
| 3 detached | 9.6420 | | | | |

## Breech Slice.

Interior diameter, 4″.74. Exterior diameter, 10″.47.
Original diameter of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.8624 | 4.8728 | 4.8676 |
| 2 | 5.6477 | 5.6555 | 5.6516 |
| 3 | 9.6444 | 9.6466 | 9.6455 |
| 4 | 10.3101 | 10.3180 | 10.31405 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.8682 | 4.8781 | 4.87315 |
| 2 | 5.6464 | 5.6543 | 5.65035 |
| 3 | 9.6441 | 9.6458 | 9.64495 |
| 4 detached | 10.3064 | 10.3176 | 10.3120 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6492 | 5.6577 | 5.65345 |
| 3 detached | 9.6425 | 9.6415 | 9.6420 |

## Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0058 | +.0053 | +.00555 |
| 2 in slice | −.0013 | −.0012 | −.00125 |
| 3 in slice | −.0003 | −.0008 | −.00055 |
| 4 detached | −.0087 | −.0004 | −.00205 |
| SECOND TO THIRD PHASE. | | | |
| 2 detached | +.0028 | +.0034 | +.0031 |
| 3 detached | −.0016 | −.0043 | −.00295 |
| FIRST TO THIRD PHASE. | | | |
| 2 detached | +.0015 | +.0022 | +.00185 |
| 3 detached | −.0019 | −.0051 | −.0035 |

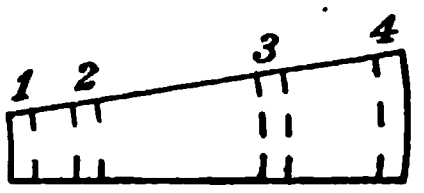
## Tube 11467 $B_3$.

### Muzzle Slice.

### State of internal strains and stresses at different phases of the slice.

#### SLICE INTACT.

Interior diameter of slice, 4″.22. Exterior diameter, 8″.57.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.34285 | ..... | .0051 | ..... | 35,200 |
| 2 | 5.14745 | ..... | .00085 | ..... | 4,900 |
| 3 | 7.1526 | .0025 | ..... | 10,500 | ..... |
| 4 | 8.40665 | .00205 | ..... | 7,300 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.84795 | | | | |
| 2 | 5.1467 | | .0016 | | 9,300 |
| 3 | 7.15185 | .00175 | | 7,300 | |
| 4 detached | 8.4036 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.1483 | | | | |
| 3 detached | 7.1501 | | | | |

## Muzzle Slice.

Interior diameter, 4″.22. Exterior diameter, 8″.57.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.3432 | 4.3425 | 4.34285 |
| 2 | 5.1534 | 5.1415 | 5.14745 |
| 3 | 7.1563 | 7.1489 | 7.1526 |
| 4 | 8.4100 | 8.4013 | 8.40565 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.3483 | 4.3476 | 4.34795 |
| 2 | 5.1526 | 5.1408 | 5.1467 |
| 3 | 7.1555 | 7.1482 | 7.15185 |
| 4 detached | 8.4142 | 8.3930 | 8.4036 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1535 | 5.1431 | 5.1483 |
| 3 detached | 7.1539 | 7.1463 | 7.1501 |

Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0051 | +.0051 | +.0051 |
| 2 in slice | −.0008 | −.0007 | −.00075 |
| 3 in slice | −.0008 | −.0007 | −.00075 |
| 4 detached | +.0042 | −.0083 | −.00205 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0009 | +.0023 | +.0016 |
| 3 detached | −.0016 | −.0019 | −.00175 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0001 | +.0016 | +.00085 |
| 3 detached | −.0024 | −.0026 | −.0025 |

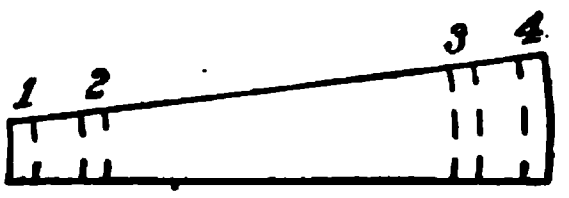
## Tube 11775 $B_3$.

### Breech Slice.

State of internal strains and stresses at different phases of the slice.

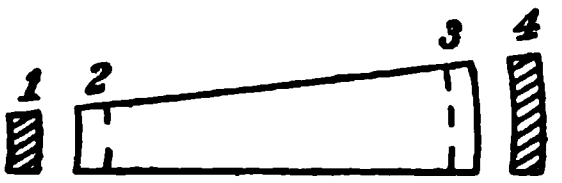
SLICE INTACT.

Interior diameter of slice, 4″.76. Exterior diameter, 10″.45.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.93075 | ..... | .00455 | ..... | 27,700 |
| 2 | 5.6453 | ..... | .0016 | ..... | 8,500 |
| 3 | 9.6379 | .0034 | ..... | 10,500 | ..... |
| 4 | 10.26475 | .00075 | ..... | 2,200 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.9353 | | | | |
| 2 | 5.6442 | | .0027 | | 14,800 |
| 3 | 9.63715 | .00265 | | 8,200 | |
| 4 detached | 10.2640 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.6469 | | | | |
| 3 detached | 9.6345 | | | | |

## Breech Slice.

Interior diameter, 4″.76. Exterior diameter, 10″.45.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.9277 | 4.9338 | 4.93075 |
| 2 | 5.6451 | 5.6456 | 5.6453 |
| 3 | 9.6399 | 9.6359 | 9.6379 |
| 4 | 10.2607 | 10.2688 | 10.26475 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.9321 | 4.9385 | 4.9353 |
| 2 | 5.6439 | 5.6445 | 5.6142 |
| 3 | 9.6392 | 9.6351 | 9.63715 |
| 4 detached | 10.2730 | 10.2550 | 10.2640 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6458 | 5.6480 | 5.6469 |
| 3 detached | 9.6367 | 9.6323 | 9.6345 |

## Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0044 | +.0047 | +.00455 |
| 2 in slice | −.0012 | −.0010 | −.0011 |
| 3 in slice | −.0007 | −.0008 | −.00075 |
| 4 detached | +.0123 | −.0188 | −.00075 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0019 | +.0035 | +.0027 |
| 3 detached | −.0025 | −.0028 | −.00265 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0007 | +.0025 | +.0016 |
| 3 detached | −.0032 | −.0036 | −.0034 |

## Tube 11775 $B_3$.

## Muzzle Slice.

State of internal strains and stresses at different phases of the slice.

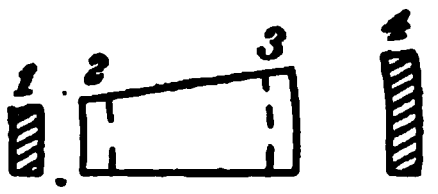
SLICE INTACT.

Interior diameter of slice, 4″.26. Exterior diameter, 9″.17.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.4219 | ..... | .0041 | ..... | 27,800 |
| 2 | 5.14545 | ..... | .0039 | ..... | 22,700 |
| 3 | 7.1460 | .00275 | ..... | 11,500 | ..... |
| 4 | 9.0031 | .00075 | ..... | 2,400 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.4260 | | | | |
| 2 | 5.1452 | | .00415 | | 24,200 |
| 3 | 7.14605 | .0028 | | 11,700 | |
| 4 detached | 9.00235 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.14985 | | | | |
| 3 detached | 7.14325 | | | | |

## Muzzle Slice.

Interior diameter, 4″.26. Exterior diameter, 9″.17.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.4241 | 4.4197 | 4.4219 |
| 2 | 5.1463 | 5.1446 | 5.14545 |
| 3 | 7.1441 | 7.1479 | 7.1460 |
| 4 | 9.0062 | 9.0000 | 9.0031 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.4285 | 4.4235 | 4.4260 |
| 2 | 5.1456 | 5.1448 | 5.1452 |
| 3 | 7.1437 | 7.1484 | 7.14605 |
| 4 detached | 9.0172 | 8.9875 | 9.00235 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1511 | 5.1476 | 5.14985 |
| 3 detached | 7.1415 | 7.1450 | 7.14325 |

## Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0044 | +.0038 | +.0041 |
| 2 in slice | −.0007 | +.0002 | −.00025 |
| 3 in slice | −.0004 | +.0005 | +.00005 |
| 4 detached | +.0110 | −.0125 | −.00075 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0055 | +.0028 | +.00415 |
| 3 detached | −.0022 | −.0034 | −.0028 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0048 | +.0030 | +.0039 |
| 3 detached | −.0026 | −.0029 | −.00275 |

## Tube 11775 $B_3$.

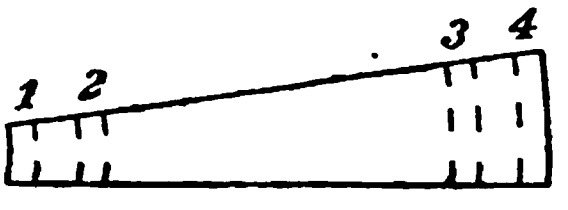
## (Second treatment.)

## Breech Slice.

## State of internal strains and stresses at different phases of the slice.

### SLICE INTACT.

Interior diameter of slice, 4″.76. Exterior diameter, 10″.45.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.93615 | ..... | .0044 | ..... | 26,700 |
| 2 | 5.6577 | ..... | .00395 | ..... | 20,900 |
| 3 | 9.64875 | .0032 | ..... | 9,900 | ..... |
| 4 | 10.26335 | .0027 | ..... | 7,800 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.94055 | | | | |
| 2 | 5.65645 | | .0052 | | 27,600 |
| 3 | 9.64815 | .0026 | | 8,100 | |
| 4 detached | 10.26065 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.66165 | | | | |
| 3 detached | 9.64555 | | | | |

## Breech Slice.

Interior diameter, 4″.76. Exterior diameter, 10″.45.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.9373 | 4.9350 | 4.93615 |
| 2 | 5.6528 | 5.6626 | 5.6577 |
| 3 | 9.6449 | 9.6526 | 9.64875 |
| 4 | 10.2632 | 10.2635 | 10.26335 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.9411 | 4.9400 | 4.94055 |
| 2 | 5.6518 | 5.6616 | 5.65645 |
| 3 | 9.6441 | 9.6522 | 9.64815 |
| 4 detached | 10.2648 | 10.2565 | 10.26065 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6570 | 5.6663 | 5.66165 |
| 3 detached | 9.6403 | 9.6508 | 9.64555 |

## Breach strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0038 | +.0050 | +.0044 |
| 2 in slice | −.0015 | −.0010 | −.00125 |
| 3 in slice | −.0008 | −.0004 | −.0006 |
| 4 detached | +.0016 | −.0070 | −.0027 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0057 | +.0047 | +.0052 |
| 3 detached | −.0088 | −.0014 | −.0026 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0042 | +.0037 | +.00395 |
| 3 detached | −.0046 | −.0018 | −.0032 |

## Tube 11775 $B_3$.

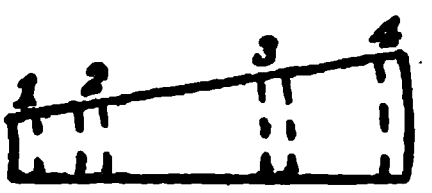
## (Second treatment.)

## Muzzle Slice.

State of internal strains and stresses at different phases of the slice.

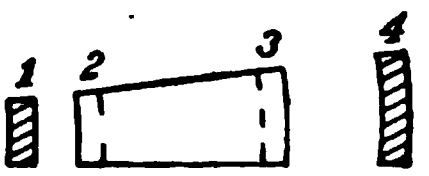
SLICE INTACT.

Interior diameter of slice, 4″.26. Exterior diameter, 9″.17.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.42555 | ..... | .00495 | ..... | 33,600 |
| 2 | 5.1588 | ..... | .0019 | ..... | 11,000 |
| 3 | 7.1394 | .00205 | ..... | 8,600 | ..... |
| 4 | 9.0177 | .00035 | ..... | 1,200 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.




| Rings. | Present mean diameter. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.4305 | | | | |
| 2 | 5.1580 | | .0027 | | 15,700 |
| 3 | 7.1390 | .00165 | | 6,900 | |
| 4 detached | 9.01735 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.1607 | | | | |
| 3 detached | 7.13735 | | | | |

## Muzzle Slice.

Interior diameter, 4″.26. Exterior diameter, 9″.17.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.4247 | 4.4264 | 4.42555 |
| 2 | 5.1611 | 5.1565 | 5.1588 |
| 3 | 7.1404 | 7.1384 | 7.1394 |
| 4 | 9.0179 | 9.0175 | 9.0177 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.4291 | 4.4319 | 4.4305 |
| 2 | 5.1600 | 5.1560 | 5.1580 |
| 3 | 7.1398 | 7.1382 | 7.1390 |
| 4 detached | 9.0275 | 9.0072 | 9.01735 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1629 | 5.1585 | 5.1607 |
| 3 detached | 7.1382 | 7.1365 | 7.13735 |

## Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0044 | +.0055 | +.00495 |
| 2 in slice | −.0011 | −.0005 | −.0008 |
| 3 in slice | −.0006 | −.0002 | −.0004 |
| 4 detached | +.0096 | −.0103 | −.00035 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0029 | +.0025 | +.0027 |
| 3 detached | −.0016 | −.0017 | −.00165 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0018 | +.0020 | +.0019 |
| 3 detached | −.0022 | −.0019 | −.00205 |

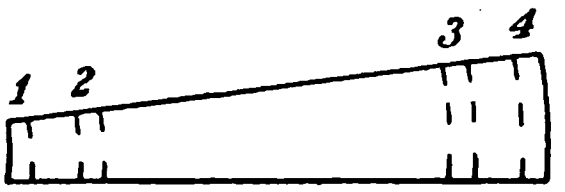
## Tube 11775 B.

## Breech Slice.

State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.76. Exterior diameter, 10″.45.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.9135 | ..... | .0048 | ..... | 29,300 |
| 2 | 5.6531 | ..... | .00245 | ..... | 13,000 |
| 3 | 9.65415 | .0041 | ..... | 12,700 | ..... |
| 4 | 10.27405 | .00375 | ..... | 10,900 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.9183 | | | | |
| 2 | 5.6517 | | .00385 | | 20,400 |
| 3 | 9.6532 | .00315 | | 9,800 | |
| 4 detached | 10.2703 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 1 detached | 5.65555 | | | | |
| 2 detached | 9.65005 | | | | |

## Breech Slice.

Interior diameter, 4″.76. Exterior diameter, 10″.45.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.9135 | 4.9135 | 4.9135 |
| 2 | 5.6515 | 5.6547 | 5.6531 |
| 3 | 9.6514 | 9.6569 | 9.65415 |
| 4 | 10.2753 | 10.2728 | 10.27405 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.9180 | 4.9186 | 4.9183 |
| 2 | 5.6499 | 5.6535 | 5.6517 |
| 3 | 9.6504 | 9.6560 | 9.6532 |
| 4 detached | 10.2793 | 10.2618 | 10.2703 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6540 | 5.6571 | 5.65555 |
| 3 detached | 9.6487 | 9.6514 | 9.65005 |

Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0045 | +.0051 | +.0048 |
| 2 in slice | −.0016 | −.0012 | −.0014 |
| 3 in slice | −.0010 | −.0009 | −.00095 |
| 4 detached | +.0040 | −.0115 | −.00375 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0041 | +.0036 | +.00385 |
| 3 detached | −.0017 | −.0046 | −.00315 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0025 | +.0024 | +.00245 |
| 3 detached | −.0027 | −.0055 | −.0041 |

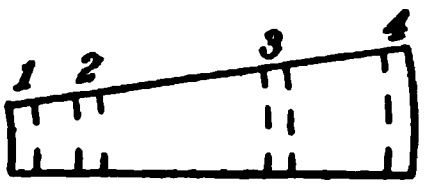
## Tube 11775 $B_3$.

### Muzzle Slice.

State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.27. Exterior diameter, 8″.57.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.4043 | ..... | .00435 | ..... | 29,600 |
| 2 | 5.14875 | ..... | .00215 | ..... | 12,500 |
| 3 | 7.15625 | .00255 | ..... | 10,600 | ..... |
| 4 | 8.36285 | .0051 | ..... | 18,900 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.40865 | | | | |
| 2 | 5.14825 | | .00265 | | 15,400 |
| 3 | 7.15515 | .00145 | | 6,100 | |
| 4 detached | 8.3577 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.1509 | | | | |
| 3 detached | 7.1537 | | | | |

## Muzzle Slice.

Interior diameter, 4″.27. Exterior diameter, 8″.57.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.4007 | 4.4079 | 4.4043 |
| 2 | 5.1480 | 5.1495 | 5.14875 |
| 3 | 7.1589 | 7.1536 | 7.15625 |
| 4 | 8.3612 | 8.3645 | 8.36285 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.4054 | 4.4119 | 4.40865 |
| 2 | 5.1475 | 5.1490 | 5.14825 |
| 3 | 7.1568 | 7.1535 | 7.15515 |
| 4 detached | 8.3500 | 8.3655 | 8.35775 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1500 | 5.1518 | 5.1509 |
| 3 detached | 7.1565 | 7.1509 | 7.1537 |

Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0047 | +.0040 | +.00435 |
| 2 in slice | −.0005 | −.0005 | −.0005 |
| 3 in slice | −.0021 | −.0001 | −.0011 |
| 4 detached | −.0112 | +.0010 | −.0051 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0025 | +.0028 | +.00265 |
| 3 detached | −.0003 | −.0026 | −.00145 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0020 | +.0023 | +.00215 |
| 3 detached | −.0024 | −.0027 | −.00255 |

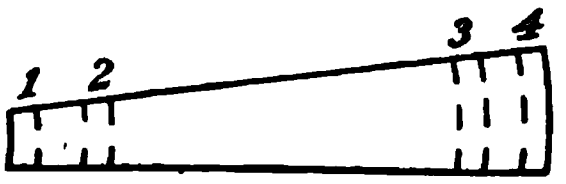
## TUBE 11775 $B_4$.

### BREECH SLICE.

State of internal strains and stresses at different phases of the slice.

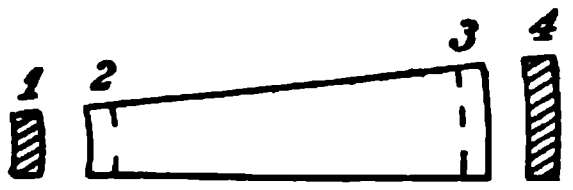
SLICE INTACT.

Interior diameter of slice, 4″.72. Exterior diameter, 10″.44.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.87685 | ..... | .0047 | ..... | 28,900 |
| 2 | 5.64325 | ..... | .0022 | ..... | 11,700 |
| 3 | 9.65075 | .0030 | ..... | 9,300 | ..... |
| 4 | 10.2761 | .00045 | ..... | 1,300 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.88155 | | | | |
| 2 | 5.64205 | | .0034 | | 18,100 |
| 3 | 9.65005 | .0023 | | 7,100 | |
| 4 detached | 10.27565 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.64545 | | | | |
| 3 detached | 9.64775 | | | | |

## Breech Slice.

Interior diameter, 4″.72. Exterior diameter, 10″.44.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.8794 | 4.8743 | 4.87685 |
| 2 | 5.6474 | 5.6391 | 5.64325 |
| 3 | 9.6474 | 9.6541 | 9.65075 |
| 4 | 10.2790 | 10.2732 | 10.2761 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.8545 | 4.8786 | 4.88155 |
| 2 | 5.6462 | 5.6379 | 5.64205 |
| 3 | 9.6467 | 9.6534 | 9.65005 |
| 4 detached | 10.2808 | 10.2705 | 10.27565 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6487 | 5.6422 | 5.64545 |
| 3 detached | 9.6446 | 9.6509 | 9.64775 |

## Breech strains released.

| Rings. | Diameter. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0051 | +.0043 | +.0047 |
| 2 in slice | −.0012 | −.0012 | −.0012 |
| 3 in slice | −.0007 | −.0007 | −.0007 |
| 4 detached | +.0018 | −.0027 | −.00045 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0025 | +.0043 | +.0034 |
| 3 detached | −.0021 | −.0025 | −.0023 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0018 | +.0031 | +.0022 |
| 3 detached | −.0028 | −.0082 | −.0080 |

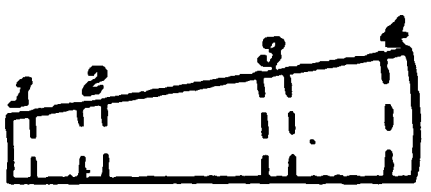
## Tube 11775 $B_4$.

### Muzzle Slice.

State of internal strains and stresses at different phases of the slice.

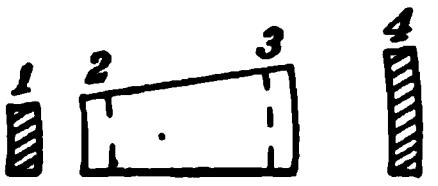
SLICE INTACT.

Interior diameter of slice, 4″.25. Exterior diameter, 8″.61.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.3985 | ..... | .0046 | ..... | 31,400 |
| 2 | 5.1488 | ..... | .00245 | ..... | 14,300 |
| 3 | 7.1411 | .00235 | ..... | 9,900 | ..... |
| 4 | 8.4447 | .0006 | ..... | 2,100 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.3961 | | | | |
| 2 | 5.14805 | | .0082 | | 18,600 |
| 3 | 7.1404 | .00165 | | 6,900 | |
| 4 detached | 8.4441 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.15125 | | | | |
| 3 detached | 7.13875 | | | | |

## Muzzle Slice.

Interior diameter, 4″.25. Exterior diameter, 8″.61.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.3945 | 4.3925 | 4.3935 |
| 2 | 5.1461 | 5.1515 | 5.1488 |
| 3 | 7.1443 | 7.1379 | 7.1411 |
| 4 | 8.4439 | 8.4455 | 8.4447 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.3969 | 4.3973 | 4.3981 |
| 2 | 5.1451 | 5.1510 | 5.14805 |
| 3 | 7.1434 | 7.1374 | 7.1404 |
| 4 detached | 8.4497 | 8.4385 | 8.4441 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1485 | 5.1540 | 5.15125 |
| 3 detached | 7.1415 | 7.1360 | 7.13875 |

Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0044 | +.0048 | +.0046 |
| 2 in slice | −.0010 | −.0005 | −.00075 |
| 3 in slice | −.0009 | −.0005 | −.0007 |
| 4 detached | +.0058 | −.0070 | −.0006 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0034 | +.0030 | +.0032 |
| 3 detached | −.0019 | −.0014 | −.00165 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0024 | +.0025 | +.00245 |
| 3 detached | −.0028 | −.0019 | −.00235 |

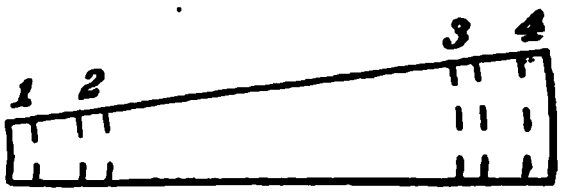
## TUBE 11775 $B_4$.

### BREECH SLICE.

State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diamcter of slice, 4″.72. Exterior diameter, 10″.42.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.8611 | ..... | .00525 | ..... | 32,400 |
| 2 | 5.6487 | ..... | .00295 | ..... | 15,700 |
| 3 | 9.6472 | .00485 | ..... | 15,100 | ..... |
| 4 | 10.24725 | .0012 | ..... | 3,500 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.86635 | | | | |
| 2 | 5.64685 | | .0048 | | 25,500 |
| 3 | 9.6462 | .00385 | | 12,000 | |
| 4 detached | 10.2460 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.65165 | | | | |
| 3 detached | 9.64235 | | | | |

## Breech Slice.

Interior diameter, 4″.72. Exterior diameter, 10″.42.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.8601 | 4.8621 | 4.8611 |
| 2 | 5.6531 | 5.6443 | 5.6487 |
| 3 | 9.6439 | 9.6505 | 9.6472 |
| 4 | 10.2455 | 10.2490 | 10.24725 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.8662 | 4.8665 | 4.86635 |
| 2 | 5.6516 | 5.6421 | 5.64685 |
| 3 | 9.6432 | 9.6492 | 9.6462 |
| 4 detached | 10.2385 | 10.2586 | 10.24605 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6551 | 5.6482 | 5.65165 |
| 3 detached | 9.6393 | 9.6454 | 9.64235 |

Breech strains released.

| Rings. | Diameter. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0061 | +.0044 | +.00525 |
| 2 in slice | −.0015 | −.0022 | −.00185 |
| 3 in slice | −.0007 | −.0013 | −.0010 |
| 4 detached | −.0070 | +.0046 | −.0012 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0085 | +.0061 | +0048 |
| 3 detached | −.0089 | −.0088 | −00885 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0020 | +.0039 | +.00295 |
| 3 detached | −.0046 | −.0051 | −.00485 |

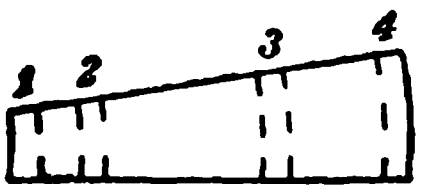
## TUBE 11775 $B_4$.

### MUZZLE SLICE.

State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.25. Exterior diameter, 8″.60.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.3990 | ..... | .00405 | ..... | 27,600 |
| 2 | 5.14955 | ..... | .00215 | ..... | 12,500 |
| 2 | 7.14885 | .00285 | ..... | 12,000 | ..... |
| 4 | 8.44905 | .0032 | ..... | 11,400 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.40805 | | | | |
| 2 | 5.1487 | | .0030 | | 17,500 |
| 3 | 7.14845 | .00245 | | 10,800 | |
| 4 detached | 8.44585 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.1517 | | | | |
| 3 detached | 7.1460 | | | | |

## Muzzle Slice.

Interior diameter, 4″.25. Exterior diameter, 8″.60.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.3998 | 4.3982 | 4.3990 |
| 2 | 5.1461 | 5.1530 | 5.14955 |
| 3 | 7.1496 | 7.1481 | 7.14885 |
| 4 | 8.4448 | 8.4533 | 8.44905 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.4040 | 4.4021 | 4.40305 |
| 2 | 5.1454 | 5.1520 | 5.1487 |
| 3 | 7.1491 | 7.1478 | 7.14845 |
| 4 detached | 8.4433 | 8.4484 | 8.44585 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1481 | 5.1553 | 5.1517 |
| 3 detached | 7.1472 | 7.1448 | 7.1460 |

## Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0042 | +.0039 | +.00405 |
| 2 in slice | −.0007 | −.0010 | −.00085 |
| 3 in slice | −.0005 | −.0003 | −.0004 |
| 4 detached | −.0015 | −.0049 | −.0032 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0027 | +.0033 | +.0030 |
| 3 detached | −.0019 | −.0030 | −.00245 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0020 | +.0023 | +.00215 |
| 3 detached | −.0024 | −.0033 | −.00285 |

## Tube 11784 $B_2$–B. S. 21.

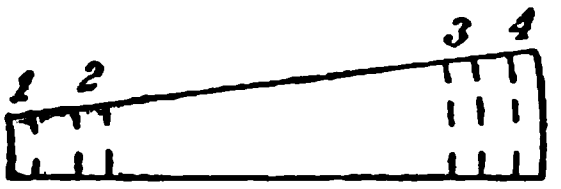
## (With the usual discard of $1\frac{1}{2}$″.)

## Breech Slice.

## State of internal strains and stresses at different phases of the slice.

### SLICE INTACT.

Interior diameter of slice, 4″.78. Exterior diameter, 10″.45.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.92215 | ..... | .0048 | ..... | 29,200 |
| 2 | 5.6450 | ..... | .00345 | ..... | 18,300 |
| 3 | 9.64275 | .0047 | ..... | 14,100 | ..... |
| 4 | 10.2937 | .00205 | ..... | 6,000 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.92695 | | | | |
| 2 | 5.6438 | | .00465 | | 24,700 |
| 3 | 9.6419 | .00385 | | 12,000 | |
| 4 detached | 10.29165 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.64845 | | | | |
| 3 detached | 9.63805 | | | | |

## Breech Slice.

Interior diameter, 4″.78. Exterior diameter, 10″.45.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.9230 | 4.9213 | 4.92215 |
| 2 | 5.6486 | 5.6414 | 5.6450 |
| 3 | 9.6480 | 9.6375 | 9.64275 |
| 4 | 10.2980 | 10.2944 | 10.2987 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.9285 | 4.9254 | 4.92695 |
| 2 | 5.6475 | 5.6401 | 5.6438 |
| 3 | 9.6471 | 9.6367 | 9.6419 |
| 4 detached | 10.2971 | 10.2862 | 10.29165 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6519 | 5.6450 | 5.64845 |
| 3 detached | 9.6442 | 9.6319 | 9.63805 |

## Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0055 | +.0041 | +.0048 |
| 2 in slice | −.0011 | −.0013 | −.0012 |
| 3 in slice | −.0009 | −.0008 | −.00085 |
| 4 detached | +.0041 | −.0082 | −.00205 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0044 | +.0049 | +.00465 |
| 3 detached | −.0029 | −.0048 | −.00385 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0033 | +.0036 | +.00345 |
| 3 detached | −.0033 | −.0056 | −.0047 |

## Tube 11784 $B_2$–M S 21.

## With the usual discard of 1½″.

### Muzzle Slice.

### State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.26. Exterior diameter, 8″.57.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.3916 | ..... | .00425 | ..... | 29,000 |
| 2 | 5.15255 | ..... | .0022 | ..... | 12,800 |
| 3 | 7.15805 | .0024 | ..... | 10,100 | ..... |
| 4 | 8.41695 | .0026 | ..... | 9,300 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.39585 | | | | |
| 2 | 5.1520 | | .00275 | | 16,000 |
| 3 | 7.1528 | .00215 | | 9,000 | |
| 4 detached | 8.41435 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.15475 | | | | |
| 3 detached | 7.15065 | | | | |

## Muzzle Slice.

Interior diameter, 4″.26. Exterior diameter, 8″.57.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.3916 | 4.3916 | 4.3916 |
| 2 | 5.1514 | 5.1587 | 5.15255 |
| 3 | 7.1542 | 7.1519 | 7.15305 |
| 4 | 8.4151 | 8.4188 | 8.41695 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.3963 | 4.3954 | 4.39585 |
| 2 | 5.1507 | 5.1533 | 5.1520 |
| 3 | 7.1535 | 7.1521 | 7.1528 |
| 4 detached | 8.4175 | 8.4112 | 8.41435 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1527 | 5.1568 | 5.15475 |
| 3 detached | 7.1508 | 7.1505 | 7.15065 |

## Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0047 | +.0038 | +.00425 |
| 2 in slice | −.0007 | −.0004 | −.00055 |
| 3 in slice | −.0007 | +.0002 | −.00025 |
| 4 detached | +.0024 | −.0076 | −.0026 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0020 | +.0035 | +.00275 |
| 3 detached | −.0027 | −.0016 | −.00215 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0018 | +.0031 | +.0022 |
| 3 detached | −.0034 | −.0014 | −.0024 |

## Tube 11784 $B_2$–B S 10.

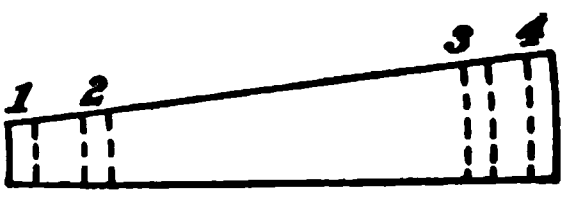
(Discard $\frac{3}{8}$″.)

### Breech Slice.

State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.78. Exterior diameter, 10″.44.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.92355 | ..... | .00528 | ..... | 32,000 |
| 2 | 5.65195 | ..... | .00355 | ..... | 18,800 |
| 3 | 9.6552 | .00505 | ..... | 15,700 | ..... |
| 4 | 10.2753 | .00435 | ..... | 12,700 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.9288 | | | | |
| 2 | 5.6510 | | .0045 | | 23,900 |
| 3 | 9.6546 | .00445 | | 13,800 | |
| 4 detached | 10.27095 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.6555 | | | | |
| 3 detached | 9.65015 | | | | |

## Breech Slice.

Interior diameter, 4″.78. Exterior diameter, 10″.44.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.9246 | 4.9225 | 4.92355 |
| 2 | 5.6521 | 5.6518 | 5.65195 |
| 3 | 9.6581 | 9.6523 | 9.6552 |
| 4 | 10.2759 | 10.2747 | 10.2753 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.9292 | 4.9284 | 4.9288 |
| 2 | 5.6514 | 5.6506 | 5.6510 |
| 3 | 9.6577 | 9.6515 | 9.6546 |
| 4 detached | 10.2620 | 10.2799 | 10.27095 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6557 | 5.6553 | 5.6555 |
| 3 detached | 9.6536 | 9.6467 | 9.65015 |

## Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0046 | +.0059 | +.00525 |
| 2 in slice | −.0007 | −.0012 | −.00095 |
| 3 in slice | −.0004 | −.0008 | −.0006 |
| 4 detached | −.0139 | +.0052 | −.00435 |

SECOND AND THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0043 | +.0047 | +.0045 |
| 3 detached | −.0041 | −.0048 | −.00445 |

FIRST AND THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0036 | +.0035 | +.00355 |
| 3 detached | −.0045 | −.0056 | −.00505 |

## Tube 11784 $B_2$–M S 10.

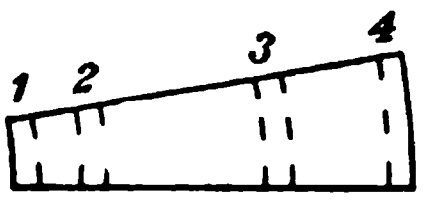
(Discard $\frac{3}{8}$″.)

### Muzzle Slice.

State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.23. Exterior diameter, 8″.56.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.3671 | ..... | .0084 | ..... | 23,400 |
| 2 | 5.1566 | ..... | .00145 | ..... | 8,400 |
| 3 | 7.1467 | .00215 | ..... | 9,000 | ..... |
| 4 | 8.4086 | .0023 | ..... | 8,200 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.3705 | | | | |
| 2 | 5.15605 | | .0020 | | 11,600 |
| 3 | 7.14645 | .0019 | | 8,000 | |
| 4 detached | 8.4063 | | | | |
| RINGS ALL DETACHED. | | | | | |
| 2 detached | 7.15805 | | | | |
| 3 detached | 7.14455 | | | | |

## Muzzle Slice.

Interior diameter, 4″.23. Exterior diameter, 8″.56.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.3699 | 4.3643 | 4.3671 |
| 2 | 5.1577 | 5.1555 | 5.1566 |
| 3 | 7.1427 | 7.1507 | 7.1467 |
| 4 | 8.4079 | 8.4093 | 8.4086 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.3736 | 4.3674 | 4.3705 |
| 2 | 5.1574 | 5.1547 | 5.15605 |
| 3 | 7.1428 | 7.1501 | 7.14645 |
| 4 detached | 8.4085 | 8.4091 | 8.4063 |
| RINGS ALL DETACHED. | | | |
| 2 detached | 5.1608 | 5.1558 | 5.15805 |
| 3 detached | 7.1415 | 7.1476 | 7.14455 |

Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0037 | +.0031 | +.0034 |
| 2 in slice | −.0003 | −.0008 | −.00055 |
| 3 in slice | +.0001 | −.0006 | −.00025 |
| 4 detached | −.0044 | −.0002 | −.0023 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0029 | +.0011 | +.0020 |
| 3 detached | −.0013 | −.0025 | −.0019 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0026 | +.0003 | +.00145 |
| 3 detached | −.0012 | −.0031 | −.00215 |

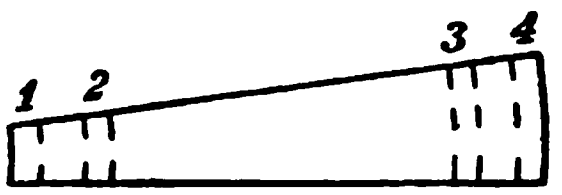
## Tube 11784 $B_3$.

## Breech Slice.

State of internal strains and stresses at different phases of the slice.

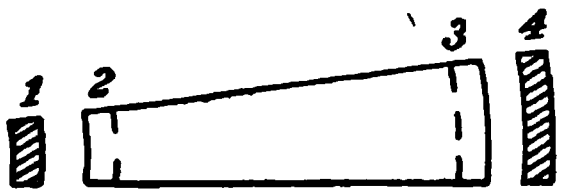
SLICE INTACT.

Interior diameter of slice, 4″.76. Exterior diameter, 10″.43.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.92495 | ..... | .0050 | ..... | 30,400 |
| 2 | 5.65445 | ..... | .0027 | ..... | 14,300 |
| 3 | 9.6414 | .00275 | ..... | 8,600 | ..... |
| 4 | 10.2712 | ..... | .0015 | ..... | 4,400 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.92995 | | | | |
| 2 | 5.65315 | | .0040 | | 21,200 |
| 3 | 9.6406 | .00195 | | 6,000 | |
| 4 detached | 10.2727 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.65715 | | | | |
| 3 detached | 9.63865 | | | | |

## Breech Slice.

Interior diameter, 4″.76. Exterior diameter, 10″.43.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.9265 | 4.9234 | 4.92495 |
| 2 | 5.6585 | 5.6504 | 5.65445 |
| 3 | 9.6438 | 9.6390 | 9.6414 |
| 4 | 10.2736 | 10.2688 | 10.2712 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.9301 | 4.9298 | 4.92995 |
| 2 | 5.6569 | 5.6494 | 5.65315 |
| 3 | 9.6427 | 9.6385 | 9.6406 |
| 4 detached | 10.2911 | 10.2543 | 10.2727 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6610 | 5.6583 | 5.65715 |
| 3 detached | 9.6399 | 9.6374 | 9.63865 |

Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0086 | +.0064 | +.0050 |
| 2 in slice | −.0016 | −.0010 | −.0013 |
| 3 in slice | −.0011 | −.0005 | −.0008 |
| 4 detached | +.0175 | −.0145 | +.0015 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0041 | +.0039 | +.0040 |
| 3 detached | −.0028 | −.0011 | −.00195 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0025 | +.0029 | +.0027 |
| 3 detached | −.0039 | −.0016 | −.00275 |

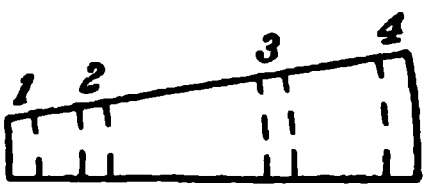
## Tube 11784 $B_3$.

## Muzzle Slice.

State of internal strains and stresses at different phases of the slice.

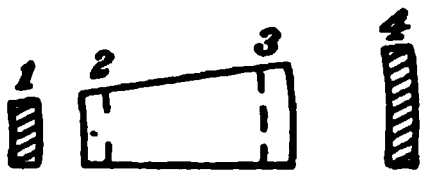
SLICE INTACT.

Interior diameter of slice, 4″.28. Exterior diameter, 8″.82.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.4359 | ..... | .0044 | ..... | 29,800 |
| 2 | 5.1500 | ..... | .0015 | ..... | 8,700 |
| 3 | 7.1520 | .0018 | ..... | 7,500 | ..... |
| 4 | 8.66365 | .00185 | ..... | 4,600 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.4408 | | | | |
| 2 | 5.14895 | | .00255 | | 14,800 |
| 3 | 7.15135 | .00115 | | 4,800 | |
| 4 detached | 8.6623 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.1515 | | | | |
| 3 detached | 7.1502 | | | | |

## Muzzle Slice.

Interior diameter, 4″.28. Exterior diameter, 8″.82.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.4331 | 4.4387 | 4.4359 |
| 2 | 5.1534 | 5.1466 | 5.1500 |
| 3 | 7.1496 | 7.1544 | 7.1520 |
| 4 | 8.6638 | 8.6635 | 8.66365 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.4375 | 4.4431 | 4.4403 |
| 2 | 5.1522 | 5.1457 | 5.14895 |
| 3 | 7.1487 | 7.1540 | 7.15135 |
| 4 detached | 8.6698 | 8.6553 | 8.6623 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1550 | 5.1480 | 5.1515 |
| 3 detached | 7.1465 | 7.1589 | 7.1502 |

Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0044 | +.0044 | +.0044 |
| 2 in slice | −.0012 | −.0009 | −.00105 |
| 3 in slice | −.0009 | −.0004 | −.00065 |
| 4 detached | +.0055 | −.0082 | −.00135 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0028 | +.0023 | +.00255 |
| 3 detached | −.0022 | −.0001 | −.00115 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0016 | +.0014 | +.0015 |
| 3 detached | −.0081 | −.0005 | −.0018 |

## Tube 11791 $B_3$

## Breech Slice.

State of internal strains and stresses at different phases of the slice.

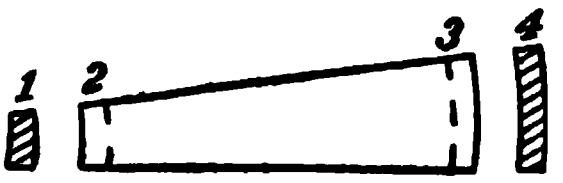
SLICE INTACT.

Interior diameter of slice, 4″.74. Exterior diameter, 10″.44.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.9008 | ..... | .0053 | ..... | 32,400 |
| 2 | 5.65245 | ..... | .0020 | ..... | 10,600 |
| 3 | 9.64965 | .00285 | ..... | 8,900 | ..... |
| 4 | 10.24905 | .0005 | ..... | 1,500 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.9061 | | | | |
| 2 | 5.6512 | | .00325 | | 17,200 |
| 3 | 9.64865 | .00185 | | 5,800 | |
| 4 detached | 10.24855 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.65445 | | | | |
| 3 detached | 9.6468 | | | | |

## Breech Slice.

Interior diameter, 4″.74. Exterior diameter, 10″.44.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.9041 | 4.8975 | 4.9008 |
| 2 | 5.6585 | 5.6514 | 5.65245 |
| 3 | 9.6466 | 9.6527 | 9.64965 |
| 4 | 10.2507 | 10.2474 | 10.24905 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.9099 | 4.9023 | 4.9061 |
| 2 | 5.6524 | 5.6500 | 5.6512 |
| 3 | 9.6458 | 9.6515 | 9.64865 |
| 4 detached | 10.2393 | 10.2578 | 10.24855 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6549 | 5.6540 | 5.65445 |
| 3 detached | 9.6445 | 9.6491 | 9.6468 |

Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0058 | +.0048 | +.0053 |
| 2 in slice | −.0011 | −.0014 | −.00125 |
| 3 in slice | −.0008 | −.0012 | −.0010 |
| 4 detached | −.0114 | +.0104 | −.0005 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0025 | +.0040 | +.00325 |
| 3 detached | −.0013 | −.0024 | −.00185 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0014 | +.0026 | +.0020 |
| 3 detached | .0021 | −.0036 | −.00285 |

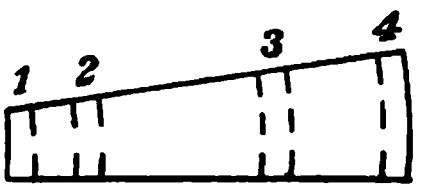
## Tube 11791 $B_3$.

## Muzzle Slice.

State of internal strains and stresses at different phases of the slice.

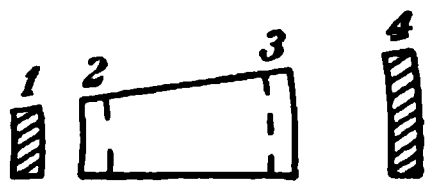
### SLICE INTACT.

Interior diameter of slice, 4″.26. Exterior diameter, 8″.57.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.3959 | ..... | .0041 | ..... | 28,000 |
| 2 | 5.14875 | ..... | .00135 | ..... | 7,900 |
| 3 | 7.14445 | .00225 | ..... | 9,400 | ..... |
| 4 | 8.4320 | ..... | .00135 | ..... | 4,800 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.4000 | | | | |
| 2 | 5.1476 | | .0025 | | 14,600 |
| 3 | 7.1436 | .0014 | | 5,900 | |
| 4 detached | 8.43335 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.1501 | | | | |
| 3 detached | 7.1422 | | | | |

## Muzzle Slice.

Interior diameter, 4″.26. Exterior diameter, 8″.57.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.3975 | 4.3943 | 4.3959 |
| 2 | 5.1480 | 5.1495 | 5.14875 |
| 3 | 7.1469 | 7.1420 | 7.14445 |
| 4 | 8.4319 | 8.4321 | 8.4320 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.4022 | 4.3978 | 4.4000 |
| 2 | 5.1470 | 5.1482 | 5.1476 |
| 3 | 7.1462 | 7.1410 | 7.1436 |
| 4 detached | 8.4247 | 8.4420 | 8.43335 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1490 | 5.1512 | 5.1501 |
| 3 detached | 7.1445 | 7.1399 | 7.1422 |

Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0047 | +.0035 | +.0041 |
| 2 in slice | −.0010 | −.0018 | −.00115 |
| 3 in slice | −.0007 | −.0010 | −.00085 |
| 4 detached | −.0072 | +.0099 | +.00135 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0020 | +.0030 | +.0025 |
| 3 detached | −.0017 | −.0011 | −.0014 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0010 | +.0017 | +.00135 |
| 3 detached | −.0024 | −.0021 | −.00225 |

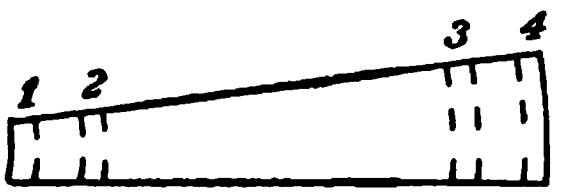
## Tube 11794 $B_3$.

## Breech Slice.

State of internal strains and stresses at different phases of the slice.

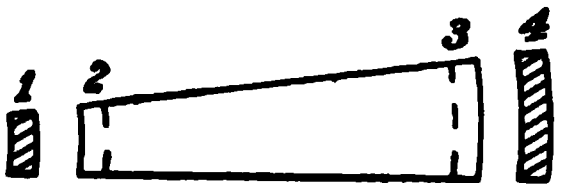
SLICE INTACT.

Interior diameter of slice, 4″.72. Exterior diameter, 10″.38.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.8816 | ..... | .00625 | ..... | 38,400 |
| 2 | 5.64785 | ..... | .00115 | ..... | 6,100 |
| 3 | 9.65575 | .00205 | ..... | 6,400 | ..... |
| 4 | 10.22165 | ..... | .0001 | ..... | 300 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.88785 | | | | |
| 2 | 5.64605 | | .00295 | | 15,600 |
| 3 | 9.6547 | .0010 | | 3,100 | |
| 4 detached | 10.22175 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.6490 | | | | |
| 3 detached | 9.6537 | | | | |

## Breech Slice.

Interior diameter, 4″.72. Exterior diameter, 10″.38.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.8869 | 4.8763 | 4.8816 |
| 2 | 5.6476 | 5.6481 | 5.64785 |
| 3 | 9.6607 | 9.6508 | 9.65575 |
| 4 | 10.2214 | 10.2219 | 10.22165 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.8930 | 4.8827 | 4.88785 |
| 2 | 5.6459 | 5.6462 | 5.64605 |
| 3 | 9.6598 | 9.6496 | 9.6547 |
| 4 detached | 10.2361 | 10.2074 | 10.22175 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6482 | 5.6498 | 5.6490 |
| 3 detached | 9.6574 | 9.6500 | 9.6537 |

Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0061 | +.0064 | +.00625 |
| 2 in slice | −.0017 | −.0019 | −.0018 |
| 3 in slice | −.0009 | −.0012 | −.00105 |
| 4 detached | +.0147 | −.0145 | +.0001 |
| SECOND TO THIRD PHASE. | | | |
| 2 detached | +.0023 | +.0036 | +.00295 |
| 3 detached | −.0024 | +.0004 | −.0010 |
| FIRST TO THIRD PHASE. | | | |
| 2 detached | +.0006 | +.0017 | +.00115 |
| 3 detached | −.0033 | −.0008 | −.00205 |

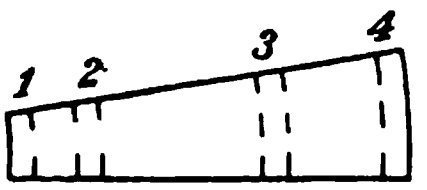
## TUBE 11794 $B_3$.

### MUZZLE SLICE.

State of internal strains and stresses at different phases of the slice.

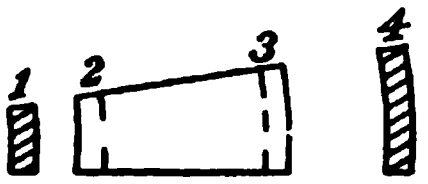
SLICE INTACT.

Interior diameter of slice, 4″.18. Exterior diameter, 8″.56.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.33495 | ..... | .0046 | ..... | 31,800 |
| 2 | 5.14435 | ..... | .0014 | ..... | 8,200 |
| 3 | 7.14245 | .0027 | ..... | 11,300 | ..... |
| 4 | 8.39525 | .0033 | ..... | 11,800 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00 Exterior diameter, 7″.30.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.33955 | | | | |
| 2 | 5.14345 | | .0023 | | 13,400 |
| 3 | 7.1417 | .00195 | | 8,200 | |
| 4 detached | 8.39195 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.14575 | | | | |
| 3 detached | 7.13975 | | | | |

## Muzzle Slice.

Interior diameter, 4″.18. Exterior diameter, 8″.56.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.3405 | 4.3294 | 4.33495 |
| 2 | 5.1421 | 5.1466 | 5.14435 |
| 3 | 7.1421 | 7.1428 | 7.14245 |
| 4 | 8.3959 | 8.3946 | 8.39525 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.3448 | 4.3343 | 4.33965 |
| 2 | 5.1412 | 5.1457 | 5.14345 |
| 3 | 7.1413 | 7.1421 | 7.1417 |
| 4 detached | 8.3939 | 8.3900 | 8.39195 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1441 | 5.1474 | 5.14575 |
| 3 detached | 7.1392 | 7.1403 | 7.13975 |

## Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0048 | +.0049 | +.0046 |
| 2 in slice | −.0009 | −.0009 | −.0009 |
| 3 in slice | −.0008 | −.0007 | −.00075 |
| 4 detached | −.0020 | −.0046 | −.0033 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0029 | +.0017 | +.0023 |
| 3 detached | −.0021 | −.0018 | −.00195 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0020 | +.0008 | +.0014 |
| 3 detached | −.0029 | −.0025 | −.0027 |

## TUBE 11837 $B_2$.

### BREECH SLICE.

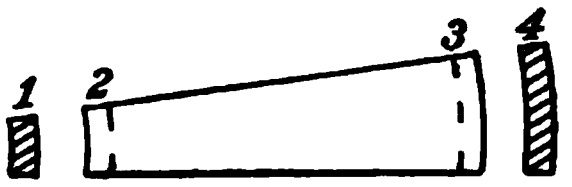
State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.73. Exterior diameter, 10.″46.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.8794 | ..... | .0048 | ..... | 29,500 |
| 2 | 5.66045 | ..... | .0028 | ..... | 14,800 |
| 3 | 9.64025 | .0031 | ..... | 9,600 | ..... |
| 4 | 10.26695 | .0014 | ..... | 4,100 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.8842 | | | | |
| 2 | 5.65915 | | .0041 | | 21,700 |
| 3 | 9.6395 | .00235 | | 7,800 | |
| 4 detached | 10.26555 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.66325 | | | | |
| 3 detached | 9.63715 | | | | |

## Breech Slice.

Interior diameter, 4″.73. Exterior diameter, 10″.46.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.8790 | 4.8798 | 4.8794 |
| 2 | 5.6561 | 5.6648 | 5.66045 |
| 3 | 9.6428 | 9.6377 | 9.64025 |
| 4 | 10.2644 | 10.2695 | 10.26695 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.8837 | 4.8847 | 4.8842 |
| 2 | 5.6647 | 5.6636 | 5.65915 |
| 3 | 9.6420 | 9.6370 | 9.6395 |
| 4 detached | 10.2750 | 10.2561 | 10.26555 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6591 | 5.6674 | 5.66325 |
| 3 detached | 9.6379 | 9.6364 | 9.63715 |

## Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0047 | +.0049 | +.0048 |
| 2 in slice | −.0014 | −.0012 | −.0013 |
| 3 in slice | −.0008 | −.0007 | −.00075 |
| 4 detached | +.0106 | −.0134 | −.0014 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0044 | +.0038 | +.0041 |
| 3 detached | −.0041 | −.0006 | −.00235 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0080 | +.0026 | +.0028 |
| 3 detached | −.0049 | −.0018 | −.0031 |

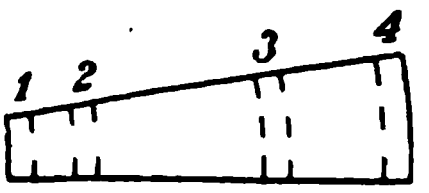
## TUBE 11837 $B_2$.

## MUZZLE SLICE.

### State of internal strains and stresses at different phases of the slice.

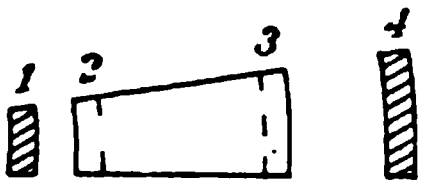
SLICE INTACT.

Interior diameter of slice, 4″.25. Exterior diameter, 8″.53.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.40715 | ..... | .0037 | ..... | 25,200 |
| 2 | 5.1522 | ..... | .0031 | ..... | 18,000 |
| 3 | 7.14975 | .0027 | ..... | 11,800 | ..... |
| 4 | 8.3596 | .0015 | ..... | 5,400 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.41085 | | | | |
| 2 | 5.1514 | | .0089 | | 22,700 |
| 3 | 7.14925 | .0022 | | 9,200 | |
| 4 detached | 8.3581 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.1553 | | | | |
| 3 detached | 7.14705 | | | | |

## MUZZLE SLICE.

Interior diameter, 4″.25. Exterior diameter, 8″.53.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches,* | *Inches.* |
| 1 | 4.4073 | 4.4070 | 4.40715 |
| 2 | 5.1479 | 5.1565 | 5.1522 |
| 3 | 7.1498 | 7.1502 | 7.14975 |
| 4 | 8.3569 | 8.3623 | 8.3596 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.4105 | 4.4112 | 4.41085 |
| 2 | 5.1467 | 5.1561 | 5.1514 |
| 3 | 7.1485 | 7.1500 | 7.14925 |
| 4 detached | 8.3589 | 8.3573 | 8.3581 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1509 | 5.1597 | 5.1553 |
| 3 detached | 7.1460 | 7.1481 | 7.14705 |

Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0032 | +.0042 | +.0037 |
| 2 in slice | −.0012 | −.0004 | −.0008 |
| 3 in slice | −.0008 | −.0002 | −.0005 |
| 4 detached | +.0020 | −.0050 | −.0015 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0042 | +.0036 | +.0039 |
| 3 detached | −.0025 | −.0019 | −.0022 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0030 | +.0032 | +.0031 |
| 3 detached | −.0033 | −.0021 | −.0027 |

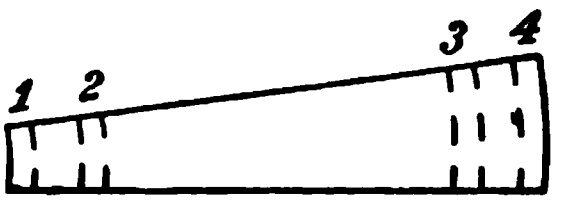
## TUBE 11837 $B_2$.

## BREECH SLICE.

State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.74. Exterior diameter, 10″.46.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.87065 | ..... | .00515 | ..... | 31,700 |
| 2 | 5.65925 | ..... | .00265 | ..... | 14,000 |
| 3 | 9.64725 | .00505 | ..... | 15,700 | ..... |
| 4 | 10.25755 | .0044 | ..... | 12,900 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.8758 | | | | |
| 2 | 5.6578 | | .0041 | | 21,700 |
| 3 | 9.64645 | .00425 | | 13,200 | |
| 4 detached | 10.25315 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.6619 | | | | |
| 3 detached | 9.6422 | | | | |

## Breech Slice.

Interior diameter, 4″.74. Exterior diameter, 10″.46.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.8731 | 4.8682 | 4.87065 |
| 2 | 5.6610 | 5.6575 | 5.65925 |
| 3 | 9.6494 | 9.6451 | 9.64725 |
| 4 | 10.2601 | 10.2550 | 10.25755 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.8782 | 4.8734 | 4.8758 |
| 2 | 5.6595 | 5.6561 | 5.6578 |
| 3 | 9.6484 | 9.6445 | 9.64645 |
| 4 detached | 10.2668 | 10.2895 | 10.25315 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6647 | 5.6591 | 5.6619 |
| 3 detached | 9.6458 | 9.6391 | 9.6422 |

## Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0051 | +.0052 | +.00515 |
| 2 in slice | −.0015 | −.0014 | −.00145 |
| 3 in slice | −.0010 | −.0006 | −.0008 |
| 4 detached | +.0067 | −.0155 | −.0044 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0052 | +.0030 | +.0041 |
| 3 detached | −.0031 | −.0054 | −.00425 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0037 | +.0016 | +.00265 |
| 3 detached | −.0041 | −.0060 | −.00505 |

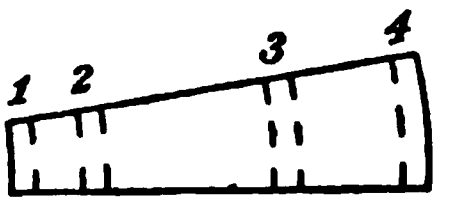
## TUBE 11837 $B_3$.

## MUZZLE SLICE.

State of internal strains and stresses at different phases of the slice.

### SLICE INTACT.

Interior diameter of slice, 4″.25. Exterior diameter, 8″.50.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.3915 | ..... | .00425 | ..... | 29,000 |
| 2 | 5.15065 | ..... | .0009 | ..... | 5,200 |
| 3 | 7.15125 | .00285 | ..... | 11,900 | ..... |
| 4 | 8.3620 | .00015 | ..... | 500 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.39575 | | | | |
| 2 | 5.14935 | | .0022 | | 12,800 |
| 3 | 7.1503 | .0019 | | 8,000 | |
| 4 detached | 8.36185 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.15155 | | | | |
| 3 detached | 7.1484 | | | | |

## Muzzle Slice.

Interior diameter, 4″.25. Exterior diameter, 8″.50.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.3955 | 4.3875 | 4.3915 |
| 2 | 5.1513 | 5.1500 | 5.15065 |
| 3 | 7.1500 | 7.1525 | 7.15125 |
| 4 | 8.3605 | 8.3635 | 8.3620 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.4001 | 4.3914 | 4.39575 |
| 2 | 5.1503 | 5.1484 | 5.14935 |
| 3 | 7.1495 | 7.1511 | 7.1503 |
| 4 detached | 8.3616 | 8.3621 | 8.36185 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1525 | 5.1506 | 5.15155 |
| 3 detached | 7.1470 | 7.1498 | 7.1484 |

Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0046 | +.0039 | +.00425 |
| 2 in slice | −.0010 | −.0016 | −.0013 |
| 3 in slice | −.0005 | −.0014 | −.00095 |
| 4 detached | +.0011 | −.0014 | −.00015 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0022 | +.0022 | +.0022 |
| 3 detached | −.0025 | −.0013 | −.0019 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0012 | +.0006 | +.0009 |
| 3 detached | −.0030 | −.0027 | −.00285 |

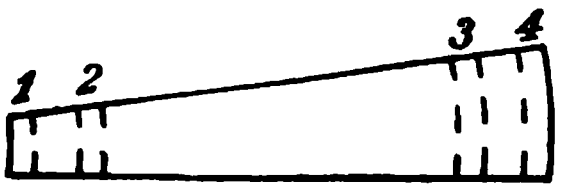
## Tube 12485 $B_7$.

## Breech Slice.

State of internal strains and stresses at different phases of the slice.

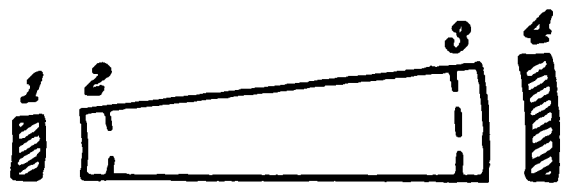
### SLICE INTACT.

Interior diameter of slice, 4″.77. Exterior diameter, 10″.43.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Inches.* | *Inches.* |
| 1 | 4.92325 | ..... | .0050 | ..... | 30,500 |
| 2 | 5.6520 | ..... | .0037 | ..... | 19,600 |
| 3 | 9.6447 | .00365 | ..... | 11,400 | ..... |
| 4 | 10.2642 | .00215 | ..... | 6,300 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.92825 | | | | |
| 2 | 5.6508 | | .0049 | | 26,000 |
| 3 | 9.6438 | .00275 | | 8,600 | |
| 4 detached | 10.26205 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.6557 | | | | |
| 3 detached | 9.64105 | | | | |

## Breech Slice.

Interior diameter, 4″.77. Exterior diameter, 10″.43.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.9277 | 4.9188 | 4.92825 |
| 2 | 5.6549 | 5.6491 | 5.6520 |
| 3 | 9.6446 | 9.6448 | 9.6447 |
| 4 | 10.2614 | 10.2670 | 10.2642 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.9324 | 4.9241 | 4.92825 |
| 2 | 5.6539 | 5.6477 | 5.6508 |
| 3 | 9.6438 | 9.6438 | 9.6438 |
| 4 detached | 10.2465 | 10.2776 | 10.26205 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6590 | 5.6524 | 5.6557 |
| 3 detached | 9.6408 | 9.6413 | 9.64105 |

Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0047 | +.0053 | +.0050 |
| 2 in slice | −.0010 | −.0014 | −.0012 |
| 3 in slice | −.0008 | −.0010 | −.0009 |
| 4 detached | −.0149 | +.0106 | −.00215 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0051 | +.0047 | +.0049 |
| 3 detached | −.0080 | −.0025 | −.00275 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0041 | +.0033 | +.0037 |
| 3 detached | −.0088 | −.0035 | −.00365 |

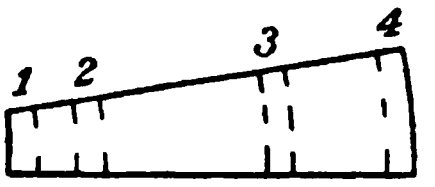
## Tube 12485 $B_7$.

## Muzzle Slice.

State of internal strains and stresses at different phases of the slice.

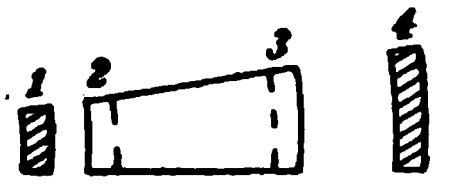
### SLICE INTACT.

Interior diameter of slice, 4″.26. Exterior diameter, 8″.56.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.40965 | ..... | .0044 | ..... | 29,900 |
| 2 | 5.1496 | ..... | .00175 | ..... | 10,200 |
| 3 | 7.14775 | .00225 | ..... | 9,400 | ..... |
| 4 | 8.40855 | .0014 | ..... | 5,000 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.41405 | | | | |
| 2 | 5.14845 | | .0029 | | 16,900 |
| 3 | 7.14705 | .00155 | | 6,500 | |
| 4 detached | 8.40215 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.15135 | | | | |
| 3 detached | 7.1455 | | | | |

## Muzzle Slice.

Interior diameter, 4″.26. Exterior diameter, 8″.56.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.4057 | 4.4136 | 4.40965 |
| 2 | 5.1468 | 5.1524 | 5.1496 |
| 3 | 7.1479 | 7.1476 | 7.14775 |
| 4 | 8.4009 | 8.4062 | 8.40355 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.4102 | 4.4179 | 4.41405 |
| 2 | 5.1456 | 5.1513 | 5.14845 |
| 3 | 7.1472 | 7.1469 | 7.14705 |
| 4 detached | 8.3999 | 8.4044 | 8.40215 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1485 | 5.1542 | 5.15135 |
| 3 detached | 7.1460 | 7.1450 | 7.1455 |

## Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0045 | +.0043 | +.0044 |
| 2 in slice | −.0012 | −.0011 | −.00115 |
| 3 in slice | −.0007 | −.0007 | −.0007 |
| 4 detached | −.0010 | −.0018 | −.0014 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0029 | +.0029 | +.0029 |
| 3 detached | −.0012 | −.0019 | −.00155 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0017 | +.0018 | +.00175 |
| 3 detached | −.0019 | −.0026 | −.00225 |

## Tube 12485 $B_7$.

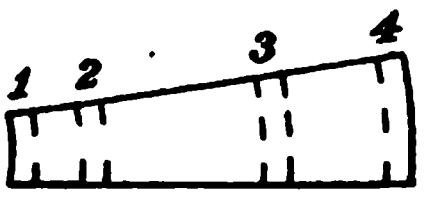
(Muzzle crop end of tube after annealing at 360° F.)

### Muzzle Slice.

State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.27. Exterior diameter, 8″.55.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.42065 | ..... | .0039 | ..... | 26,500 |
| 2 | 5.15085 | ..... | .0019 | ..... | 11,100 |
| 3 | 7.14635 | .0018 | ..... | 7,600 | ..... |
| 4 | 8.40795 | .0008 | ..... | 2,900 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice 5″.00. Exterior diameter, 7″.30.

## Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0040 | +.0038 | +.0039 |
| 2 in slice | −.0004 | −.0005 | −.00045 |
| 3 in slice | −.0002 | .0000 | −.0001 |
| 4 detached | −.0065 | +.0049 | −.0008 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0028 | +.0019 | +.00235 |
| 3 detached | −.0017 | −.0017 | −.0017 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0024 | +.0014 | +.0019 |
| 3 detached | −.0019 | −.0017 | −.0018 |

## Tube 15021 $B_6$.

## Breech Slice.

### State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.77. Exterior diameter, 10″.48.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.91815 | ..... | .0058 | ..... | 32,300 |
| 2 | 5.66145 | ..... | .00085 | ..... | 4,500 |
| 3 | 9.65095 | .0018 | ..... | 5,600 | ..... |
| 4 | 10.3262 | .0020 | ..... | 5,800 | ..... |

## Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0063 | +.0043 | +.0053 |
| 2 in slice | −.0011 | −.0011 | −.0011 |
| 3 in slice | −.0004 | −.0006 | −.0005 |
| 4 detached | +.0071 | −.0111 | −.0020 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0010 | +.0029 | +.00195 |
| 3 detached | −.0011 | −.0015 | −.0013 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | −.0001 | +.0018 | +.00085 |
| 3 detached | −.0015 | −.0021 | −.0018 |

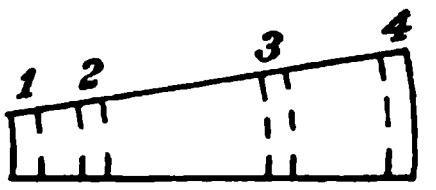
## Tube 15021 $B_6$.

## Muzzle Slice.

### State of internal strains and stresses at different phases of the slice.

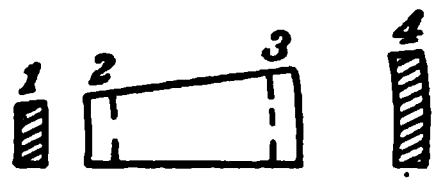
SLICE INTACT.

Interior diameter of slice, 4″.28. Exterior diameter, 8″.65.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.44445 | ..... | .0045 | ..... | 30,400 |
| 2 | 5.1534 | ..... | .0010 | ..... | 5,800 |
| 3 | 7.15475 | .0018 | ..... | 7,500 | ..... |
| 4 | 8.46795 | ..... | .0008 | ..... | 2,800 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00 Exterior diameter, 7″.30.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.44895 | | | | |
| 2 | 5.1523 | | .0021 | | 12,200 |
| 3 | 7.15395 | .0010 | | 4,100 | |
| 4 detached | 8.46875 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.1544 | | | | |
| 3 detached | 7.15295 | | | | |

## Muzzle Slice.

Interior diameter, 4″.28. Exterior diameter, 8″.65.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.4426 | 4.4468 | 4.44445 |
| 2 | 5.1548 | 5.1520 | 5.1534 |
| 3 | 7.1542 | 7.1558 | 7.15475 |
| 4 | 8.4670 | 8.4689 | 8.46795 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.4470 | 4.4509 | 4.44895 |
| 2 | 5.1540 | 5.1506 | 5.1523 |
| 3 | 7.1535 | 7.1544 | 7.15395 |
| 4 detached | 8.4584 | 8.4841 | 8.46875 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1563 | 5.1525 | 5.1544 |
| 3 detached | 7.1524 | 7.1535 | 7.15295 |

## Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0044 | +.0046 | +.0045 |
| 2 in slice | −.0008 | −.0014 | −.0011 |
| 3 in slice | −.0007 | −.0009 | −.0008 |
| 4 detached | −.0136 | +.0152 | +.0008 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0023 | +.0019 | +.0021 |
| 3 detached | −.0011 | −.0009 | −.0010 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0015 | +.0005 | +.0010 |
| 3 detached | −.0018 | −.0018 | −.0018 |

## Tube 15021 $B_6$.

## (Second treatment.)

## Breech Slice.

State of internal strains and stresses at different phases of the slice.

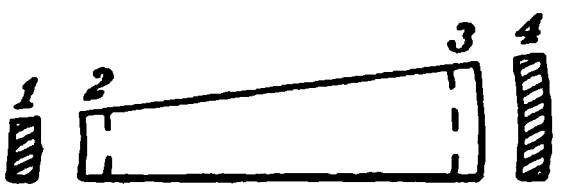
### SLICE INTACT.

Interior diameter of slice, 4″.77. Exterior diameter, 10″.48.




| Rings. | Present mean diameters. | Strains, | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.93255 | ..... | .00605 | ..... | 36,800 |
| 2 | 5.6610 | ..... | .00245 | ..... | 13,000 |
| 3 | 9.65555 | .0036 | ..... | 11,200 | ..... |
| 4 | 10.30245 | .00865 | ..... | 10,600 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.9386 | | | | |
| 2 | 5.65965 | | .0038 | | 20,100 |
| 3 | 9.65465 | .0027 | | 8,400 | |
| 4 detached | 10.2988 | | | | |
| RINGS ALL DETACHED. | | | | | |
| 2 detached | 5.66845 | | | | |
| 3 detached | 9.65195 | | | | |

## Breech Slice.

Interior diameter, 4″.77. Exterior diameter, 10″.48.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.9360 | 4.9291 | 4.93255 |
| 2 | 5.6625 | 5.6595 | 5.6610 |
| 3 | 9.6561 | 9.6550 | 9.65555 |
| 3 | 10.3070 | 10.2979 | 10.30245 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.9418 | 4.9354 | 4.9386 |
| 2 | 5.6612 | 5.6581 | 5.65965 |
| 3 | 9.6552 | 9.6541 | 9.65465 |
| 4 detached | 10.3000 | 10.2976 | 10.2988 |
| RINGS ALL DETACHED. | | | |
| 2 detached | 5.6655 | 5.6614 | 5.66845 |
| 3 detached | 9.6525 | 9.6514 | 9.65195 |

## Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0058 | +.0063 | +.00605 |
| 2 in slice | −.0013 | −.0014 | −.00135 |
| 3 in slice | −.0009 | −.0009 | −.0009 |
| 4 detached | −.0070 | −.0063 | −.00665 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0043 | +.0033 | +.0038 |
| 3 detached | −.0027 | −.0027 | −.0027 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0080 | +.0019 | +.00245 |
| 3 detached | −.0086 | −.0086 | −.0086 |

## Tube 15021 $B_6$.

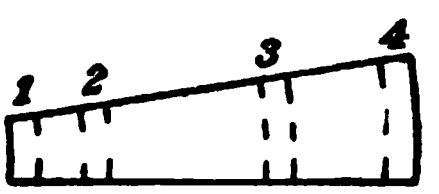
## (Second treatment.)

## Muzzle Slice.

State of internal strains and stresses at different phases of the slice.

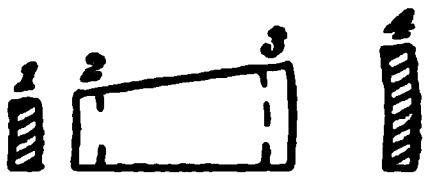
### SLICE INTACT.

Interior diameter of slice 4″.28. Exterior diameter 8″.65.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.4498 | ..... | .0038 | ..... | 25,600 |
| 2 | 5.14775 | ..... | .00145 | ..... | 8,400 |
| 3 | 7.1590 | .0022 | ..... | 9,200 | ..... |
| 4 | 8.47265 | .0007 | ..... | 2,500 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″. Exterior diameter, 7″.30.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.4536 | | | | |
| 2 | 5.1469 | | .0028 | | 13,400 |
| 3 | 7.1584 | .0016 | | 6,700 | |
| 4 detached | 8.47195 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.1492 | | | | |
| 3 detached | 7.1568 | | | | |

## Muzzle Slice.

Interior diameter, 4″.28. Exterior diameter, 8″.65.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.4516 | 4.4480 | 4.4498 |
| 2 | 5.1465 | 5.1490 | 5.14775 |
| 3 | 7.1590 | 7.1590 | 7.1590 |
| 4 | 8.4803 | 8.4650 | 8.47265 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.4589 | 4.4583 | 4.4586 |
| 2 | 5.1453 | 5.1485 | 5.1469 |
| 3 | 7.1580 | 7.1588 | 7.1584 |
| 4 | 8.4899 | 8.4540 | 8.47195 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1479 | 5.1505 | 5.1492 |
| 3 detached | 7.1568 | 7.1568 | 7.1568 |

Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0023 | +.0053 | +.0038 |
| 2 in slice | −.0012 | −.0005 | −.00085 |
| 3 in slice | −.0010 | −.0002 | −.0006 |
| 4 detached | +.0096 | −.0110 | −.0007 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0026 | +.0020 | +.0023 |
| 3 detached | −.0012 | −.0020 | −.0016 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0014 | +.0015 | +.00145 |
| 3 detached | −.0022 | −.0022 | −.0022 |

## TUBE 15021 $B_6$.

## BREECH SLICE.

State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.76. Exterior diameter, 10″.42.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.98245 | ..... | .00645 | ..... | 39,200 |
| 2 | 5.65005 | ..... | .00805 | ..... | 16,200 |
| 3 | 9.6408 | .0040 | ..... | 12,400 | ..... |
| 4 | 10.25445 | .0054 | ..... | 15,700 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.9389 | | | | |
| 2 | 5.64895 | | .00415 | | 22,000 |
| 3 | 9.6400 | .0032 | | 10,000 | |
| 4 detached | 10.24905 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.6531 | | | | |
| 3 detached | 9.6368 | | | | |

## Breech Slice.

Interior diameter, 4″.76. Exterior diameter, 10″.42.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.9324 | 4.9325 | 4.93245 |
| 2 | 5.6485 | 5.6516 | 5.65005 |
| 3 | 9.6392 | 9.6424 | 9.6408 |
| 4 | 10.2559 | 10.2530 | 10.25445 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.9390 | 4.9388 | 4.9389 |
| 2 | 5.6470 | 5.6509 | 5.64895 |
| 3 | 9.6383 | 9.6417 | 9.6400 |
| 4 detached | 10.2626 | 10.2355 | 10.24905 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.6507 | 5.6555 | 5.6531 |
| 3 detached | 9.6368 | 9.6368 | 9.6368 |

## Breech strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0066 | +.0063 | +.00645 |
| 2 in slice | −.0015 | −.0007 | −.0011 |
| 3 in slice | −.0009 | −.0007 | −.0008 |
| 4 detached | +.0067 | −.0175 | −.0054 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0087 | +.0046 | +.00415 |
| 3 detached | −.0015 | −.0049 | −.0032 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0022 | +.0039 | +.00305 |
| 3 detached | −.0024 | −.0056 | −.0040 |

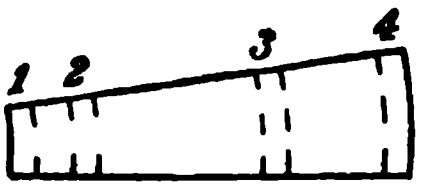
## Tube 15021 $B_6$.

## Muzzle Slice.

### State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.31. Exterior diameter, 8″.63.




| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 | 4.44975 | ..... | .00475 | ..... | 32,000 |
| 2 | 5.15425 | ..... | .0028 | ..... | 16,300 |
| 3 | 7.15105 | .00225 | ..... | 9,400 | ..... |
| 4 | 8.4859 | .0012 | ..... | 4,200 | ..... |

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.30.

| Rings. | Present mean diameters. | Strains. | | Stresses per square inch. | |
|---|---|---|---|---|---|
| | | Tension. | Compression. | Tension. | Compression. |
| | *Inches.* | *Inch.* | *Inch.* | *Pounds.* | *Pounds.* |
| 1 detached | 4.4545 | | | | |
| 2 | 5.15375 | | .0033 | | 19,200 |
| 3 | 7.15095 | .00215 | | 9,000 | |
| 4 detached | 8.4847 | | | | |

RINGS ALL DETACHED.

| | | | | | |
|---|---|---|---|---|---|
| 2 detached | 5.15705 | | | | |
| 3 detached | 7.1488 | | | | |

## Muzzle Slice.

Interior diameter, 4″.31. Exterior diameter, 8″.63.
Original diameters of rings in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 | 4.4471 | 4.4524 | 4.44975 |
| 2 | 5.1575 | 5.1510 | 5.15425 |
| 3 | 7.1501 | 7.1520 | 7.15105 |
| 4 | 8.4883 | 8.4835 | 8.4859 |

Rings 1 and 4 detached; rings 2 and 3 in the slice.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inches.* | *Inches.* | *Inches.* |
| 1 detached | 4.4520 | 4.4570 | 4.4545 |
| 2 | 5.1565 | 5.1510 | 5.15375 |
| 3 | 7.1494 | 7.1525 | 7.15095 |
| 4 detached | 8.4871 | 8.4823 | 8.4847 |

RINGS ALL DETACHED.

| | | | |
|---|---|---|---|
| 2 detached | 5.1593 | 5.1548 | 5.15705 |
| 3 detached | 7.1478 | 7.1498 | 7.1488 |

## Muzzle strains released.

| Rings. | Diameters. | | |
|---|---|---|---|
| | A. | B. | Mean. |
| | *Inch.* | *Inch.* | *Inch.* |
| 1 detached | +.0049 | +.0046 | +.00475 |
| 2 in slice | −.0010 | .0000 | −.0005 |
| 3 in slice | −.0007 | +.0005 | −.0001 |
| 4 detached | −.0012 | −.0012 | −.0012 |

SECOND TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0028 | +.0038 | +.0033 |
| 3 detached | −.0016 | −.0027 | −.00215 |

FIRST TO THIRD PHASE.

| | | | |
|---|---|---|---|
| 2 detached | +.0018 | +.0038 | +.0028 |
| 3 detached | −.0023 | −.0022 | −.00225 |

# BROKEN SUSPENSION ROD

FROM

# 8-INCH DISAPPEARING CARRIAGE AT FORT RODMAN.

## STEEL FORGING.

1011

## No. 6842.

Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000133 | .000133 | 0. | ..... | |
| 10,000 | .000333 | .000200 | ..... | ..... | |
| 20,000 | .000700 | .000367 | ..... | ..... | |
| 30,000 | .001033 | .000333 | ..... | ..... | |
| 40,000 | .001400 | .000367 | ..... | ..... | |
| 45,000 | .001600 | .000200 | ..... | ..... | |
| 46,000 | .001633 | .000033 | ..... | ..... | |
| 47,000 | .001700 | .000067 | ..... | ..... | |
| 48,000 | .001800 | .000100 | ..... | ..... | Elastic limit. |
| 49,000 | .002067 | .000267 | ..... | ..... | |
| 50,000 | .002433 | .000366 | ..... | ..... | |
| 51,000 | .002800 | .000367 | ..... | ..... | |
| 52,000 | .003333 | .000533 | ..... | ..... | |
| 53,000 | .003833 | .000500 | ..... | ..... | |
| 54,000 | .004467 | .000634 | ..... | ..... | |
| 55,000 | .004833 | .000366 | ..... | ..... | |
| 56,000 | .005667 | .000834 | ..... | ..... | |
| 57,000 | .006133 | .000466 | ..... | ..... | |
| 58,000 | .006667 | .000534 | ..... | ..... | |
| 106,820 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 106,820 |
| Elastic limit per square inch of original section | do... | 48,000 |
| Elongation per inch after rupture | inch.. | .1700 |
| Elongation per inch under strain at elastic limit | do... | .001800 |
| Reduction in diameter at point of rupture | do... | .084 |
| Reduction in area after rupture, per cent of original section | | 27.6 |
| Position of rupture | | 1″.59 from neck |
| Character of broken surface | | granular, dull silky spot near the circumference |
| Elongation of inch sections | | ″.14, ″.25*, ″.12 |

## No. 6843.

Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Set el p |
|---|---|---|
| *Pounds.* | *Inch.* | |
| 1,000 | 0. | |
| 5,000 | .000100 | |
| 10,000 | .000267 | |
| 20,000 | .000600 | |
| 30,000 | .000933 | |
| 40,000 | .001267 | |
| 45,000 | .001433 | |
| 47,000 | .001533 | |
| 48,000 | .001667 | |
| 49,000 | .002000 | |
| 50,000 | .002433 | |
| 51,000 | .002667 | |
| 52,000 | .003333 | |
| 53,000 | .003800 | |
| 54,000 | .004400 | |
| 55,000 | .004733 | |
| 56,000 | .005500 | |
| 105,400 | ..... | |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 105,400 |
| Elastic limit per square inch of original section | do... | 48,000 |
| Elongation per inch after rupture | inch.. | 1533 |
| Elongation per inch under strain at elastic limit | do... | .001667 |
| Reduction in diameter at point of rupture | do... | .064 |
| Reduction in area after rupture, per cent of original section | | 27.6 |
| Position of rupture | | ".85 from neck |
| Character of broken surface | | granular, dull silky spot at the center |
| Elongation of inch sections | | ".10, ".15, ".21 |

## No. 6844.

Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000183 | 000183 | 0. | ..... | |
| 10,000 | .000300 | .000167 | ..... | ..... | |
| 20,000 | .000667 | .000367 | ..... | ..... | |
| 30,000 | .001033 | .000366 | ..... | ..... | |
| 40,000 | .001400 | .000367 | ..... | ..... | |
| 43,000 | .001500 | .000100 | ..... | ..... | |
| 45,000 | .001633 | .000133 | ..... | ..... | |
| 46,000 | .001667 | .000034 | ..... | ..... | |
| 47,000 | .001733 | .000066 | ..... | ..... | |
| 48,000 | .001800 | .000067 | ..... | ..... | Elastic limit. |
| 49,000 | .002100 | .000300 | ..... | ..... | |
| 50,000 | .002600 | .000500 | ..... | ..... | |
| 51,000 | .002867 | .000267 | ..... | ..... | |
| 52,000 | .003600 | .000733 | ..... | ..... | |
| 53,000 | .003933 | .000333 | ..... | ..... | |
| 54,000 | .004733 | .000800 | ..... | ..... | |
| 55,000 | .005100 | .000367 | ..... | ..... | |
| 56,000 | .005733 | .000633 | ..... | ..... | |
| 57,000 | .006167 | .000434 | ..... | ..... | |
| 58,000 | .007000 | .000833 | ..... | ..... | |
| 106,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 106,000 |
| Elastic limit per square inch of original section | do... | 48,000 |
| Elongation per inch after rupture | inch.. | .1633 |
| Elongation per inch under strain at elastic limit | do... | .001800 |
| Reduction in diameter at point of rupture | do... | .084 |
| Reduction in area after rupture, per cent of original section | | 27.6 |
| Position of rupture | | 1" from neck |
| Character of broken surface | | granular, dull silky spot near center |
| Elongation of inch sections | | ".12, ".17, ".20* |

Three specimens, $\frac{1}{2}'' \times \frac{1}{2}''$ cross-section dimensions, were cut off the rod at the fractured end.

These specimens were tested by bending cold. The samples bent through an angle of about 30° each, and then fractured with a granular appearance.

# BURST 12-INCH TORPEDO SHELL.

## SPECIMENS FROM FRAGMENTS.

### STEEL CASTING.

## No. 6490.

Longitudinal specimen.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .000067 | .000067 | 0. | ..... | |
| 10,000 | .000300 | .000233 | ..... | ..... | |
| 15,000 | .000433 | .000333 | ..... | ..... | |
| 20,000 | .000667 | .000234 | ..... | ..... | |
| 25,000 | .000833 | .000166 | ..... | ..... | |
| 30,000 | .001033 | .000200 | ..... | ..... | |
| 31,000 | .001100 | .000067 | ..... | ..... | |
| 32,000 | .001167 | .000067 | ..... | ..... | |
| 33,000 | .001200 | .000033 | ..... | ..... | |
| 34,000 | .001300 | .000100 | ..... | ..... | |
| 35,000 | .001333 | .000033 | ..... | ..... | |
| 36,000 | .001400 | .000067 | ..... | ..... | |
| 37,000 | .001467 | .000067 | ..... | ..... | |
| 38,000 | .001567 | .000100 | ..... | ..... | |
| 39,000 | .001633 | .000066 | ..... | ..... | Elastic limit. |
| 40,000 | .001800 | .000167 | ..... | ..... | |
| 41,000 | .001867 | .000067 | ..... | ..... | |
| 42,000 | .002033 | .000166 | ..... | ..... | |
| 43,000 | .002233 | .000200 | ..... | ..... | |
| 44,000 | .002367 | .000134 | ..... | ..... | |
| 45,000 | .002633 | .000266 | ..... | ..... | |
| 46,000 | .003100 | .000467 | ..... | ..... | |
| 47,000 | .003467 | .000367 | ..... | ..... | |
| 48,000 | .004067 | .000600 | ..... | ..... | |
| 49,000 | .004567 | .000500 | ..... | ..... | |
| 50,000 | .006000 | .001433 | ..... | ..... | |
| 52,000 | .007667 | .001667 | ..... | ..... | |
| 54,000 | .010733 | .003066 | ..... | ..... | |
| 56,000 | .014000 | .003267 | ..... | ..... | |
| 58,000 | .017400 | .003400 | ..... | ..... | |
| 60,000 | .021667 | .004267 | ..... | ..... | |
| 60,640 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 60,640 |
| Elastic limit per square inch of original section | do... | 39,000 |
| Elongation per inch after rupture | inch.. | .0267 |
| Elongation per inch under strain at elastic limit | do... | .001633 |
| Reduction in diameter at point of rupture | do... | .004 |
| Reduction in area after rupture, per cent of original section | | 1.5 |
| Position of rupture | | 1″.15 from neck |
| Character of broken surface | | granular, dark spot at circumference |
| Elongation of inch sections | | ″.02, ″.03*, ″.03 |

## No. 6491.

Tangential specimen.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00085 | .00020 | ..... | ..... | |
| 15,000 | .00055 | .00020 | ..... | ..... | |
| 20,000 | .00075 | .00020 | ..... | ..... | |
| 25,000 | .00110 | .00035 | ..... | ..... | |
| 28,000 | .00150 | .00040 | ..... | ..... | |
| 29,000 | .00165 | .00015 | ..... | ..... | Elastic limit. |
| 30,000 | .00235 | .00070 | ..... | ..... | |
| 31,000 | .00300 | .00065 | ..... | ..... | |
| 32,000 | .00350 | .00050 | ..... | ..... | |
| 33,000 | .00440 | .00090 | ..... | ..... | |
| 34,000 | .00525 | .00085 | ..... | ..... | |
| 35,000 | .00640 | .00115 | ..... | ..... | |
| 36,000 | .00750 | .00110 | ..... | ..... | |
| 38,000 | .01000 | .00250 | ..... | ..... | |
| 40,000 | .01300 | .00300 | ..... | ..... | |
| 42,000 | .01640 | .00340 | ..... | ..... | |
| 44,000 | .02150 | .00510 | ..... | ..... | |
| 45,240 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 45,240 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .0400 |
| Elongation per inch under strain at elastic limit | do... | .00165 |
| Reduction in diameter at point of rupture | do... | .014 |
| Reduction in area after rupture, per cent of original section | | 5.0 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | granular 60 per cent, dark spongy 40 per cent |
| Elongation of inch sections | | ″.08, ″.05* |

## No. 6492.

Longitudinal specimen.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00016 | .00016 | 0. | ..... | |
| 10,000 | .00033 | .00017 | .00001 | .00001 | |
| 15,000 | .00054 | .00021 | .00002 | .00001 | |
| 18,000 | .00068 | .00014 | ..... | ..... | |
| 19,000 | .00071 | .00003 | ..... | ..... | Elastic limit. |
| 20,000 | .00078 | .00007 | .00008 | .00006 | |
| 21,000 | .00085 | .00007 | ..... | ..... | |
| 22,000 | .00091 | .00006 | ..... | ..... | |
| 23,000 | .00100 | .00009 | ..... | ..... | |
| 24,000 | .00108 | .00008 | ..... | ..... | |
| 25,000 | .00119 | .00011 | .00028 | .00020 | |
| 26,000 | .00132 | .00013 | ..... | ..... | |
| 27,000 | .00149 | .00017 | ..... | ..... | |
| 28,000 | .00170 | .00021 | ..... | ..... | |
| 30,000 | .00240 | .00070 | .00130 | .00102 | |
| 32,000 | .00380 | .00140 | ..... | ..... | |
| 34,000 | .00550 | .00170 | ..... | ..... | |
| 36,000 | .00740 | .00190 | ..... | ..... | |
| 38,000 | .01000 | .00260 | ..... | ..... | |
| 38,500 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 38,500 |
| Elastic limit per square inch of original section | do... | 19,000 |
| Elongation per inch after rupture | inch.. | .012 |
| Elongation per inch under strain at elastic limit | do... | .00071 |
| Reduction in diameter at point of rupture | do... | .009 |
| Reduction in area after rupture, per cent of original section | | 1.5 |
| Position of rupture | | 1″.75 from neck |
| Character of broken surface | | granular 60 per cent, dull spongy 40 per cent |

## No. 6497.

Longitudinal specimen.
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 2".

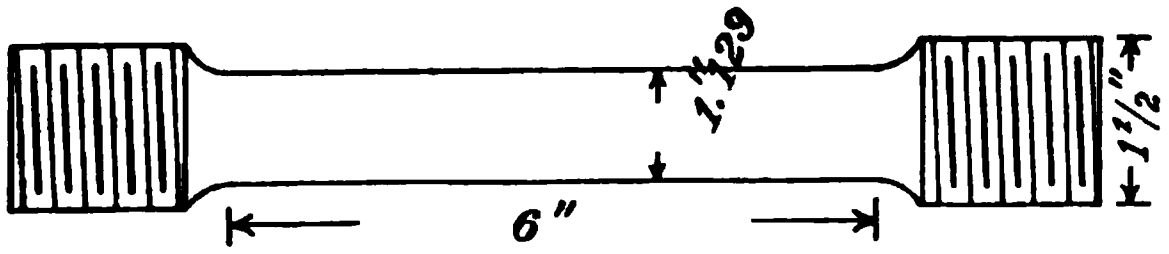
| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | 0. | ..... | |
| 15,000 | .00050 | .00015 | 0. | ..... | |
| 20,000 | .00060 | .00010 | 0. | ..... | |
| 25,000 | .00080 | .00020 | .00005 | .00005 | |
| 30,000 | .00100 | .00020 | .00005 | 0. | |
| 35,000 | .00130 | .00030 | .00030 | .00025 | Elastic limit, approximate.. |
| 36,000 | .00140 | .00010 | ..... | ..... | |
| 37,000 | .00150 | .00010 | ..... | ..... | |
| 38,000 | .00160 | .00010 | ..... | ..... | |
| 39,000 | .00175 | .00015 | ..... | ..... | |
| 40,000 | .00200 | .00025 | .00070 | .00040 | |
| 41,000 | .00220 | .00020 | ..... | ..... | |
| 42,000 | .00250 | .00030 | ..... | ..... | |
| 43,000 | .00280 | .00030 | ..... | ..... | |
| 44,000 | .00310 | .00030 | ..... | ..... | |
| 45,000 | .00350 | .00040 | ..... | ..... | |
| 46,000 | .00410 | .00060 | ..... | ..... | |
| 47,000 | .00475 | .00065 | ..... | ..... | |
| 48,000 | .00580 | .00105 | ..... | ..... | |
| 49,000 | .00635 | .00055 | ..... | ..... | |
| 50,000 | .00715 | .00080 | ..... | ..... | |
| 52,000 | .00895 | .00180 | ..... | ..... | |
| 54,000 | .01060 | .00165 | ..... | ..... | |
| 56,000 | .01315 | .00255 | ..... | ..... | |
| 58,000 | .01540 | .00225 | ..... | ..... | |
| 60,000 | .01785 | .00245 | ..... | ..... | |
| 62,100 | .02075 | .00290 | ..... | ..... | |
| 64,000 | .02405 | .00330 | ..... | ..... | |
| 64,720 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 64,720 |
| Elastic limit per square inch of original section (approximate) | do... | 35,000 |
| Elongation per inch after rupture | inch.. | .0300 |
| Elongation per inch under strain at elastic limit | do... | .00130 |
| Reduction in diameter at point of rupture | do... | .004 |
| Reduction in area after rupture, per cent of original section | | 1.5 |
| Position of rupture | | ".6 from neck |
| Character of broken surface | | granular, spongy streak across surface |
| Elongation of inch sections | | ".02, ".04* |

## STEEL SPECIMEN FROM FORGED ARMOR PLATE.

No. 9762.




| | | |
|---|---|---|
| Sectional area | square inch.. | 1.00 |
| Elastic limit per square inch | pounds.. | 50,200 |
| Tensile strength per square inch | do... | 85,600 |
| Elongation in 6 inches | per cent.. | 22.5 |
| Contraction of area | do.. | 45.9 |
| Appearance of fracture | | silky, cup shaped |
| Elongation of inch sections | | ″.11, ″.15, ″.18, ″.46*, ″.31, ″.14 |

## COLD ROLLED STEEL BAR.

No. 7208.

Bar ¾″ diameter, turned down in the stem to ″.564 diameter.
Sectional area, .25 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00065 | .00035 | ..... | ..... | |
| 30,000 | .00105 | .00040 | 0. | ..... | |
| 40,000 | .00145 | .00040 | ..... | ..... | |
| 50,000 | .00160 | .00015 | ..... | ..... | |
| 60,000 | .00205 | .00045 | 0. | ..... | |
| 70,000 | .00250 | .00045 | ..... | ..... | |
| 71,000 | .00255 | .00005 | ..... | ..... | Elastic limit. |
| 72,000 | .00275 | .00020 | ..... | ..... | |
| 73,000 | .00290 | .00015 | ..... | ..... | |
| 74,000 | .00305 | .00015 | .00040 | .00040 | |
| 75,000 | .00325 | .00020 | ..... | ..... | |
| 76,000 | .00355 | .00030 | ..... | ..... | |
| 77,000 | .00375 | .00020 | ..... | ..... | |
| 78,000 | .00465 | .00090 | ..... | ..... | |
| 80,000 | .00900 | .00435 | ..... | ..... | |
| 84,000 | .02900 | .02000 | ..... | ..... | |
| 87,240 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 87,240 |
| Elastic limit per square inch of original section | do... | 71,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .00255 |
| Reduction in diameter at point of rupture | do... | .135 |
| Reduction in area after rupture, per cent of original section | | 46.2 |
| Position of rupture | | 1″.14 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.13, ″.25* |

# ARMOR PLATE FOR TESTING SHELLS.

## STEEL CASTINGS.

## No. 6807.

Marks, $\overset{C\ S}{A\ P\ 3}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00015 | .00015 | 0. | ..... | |
| 10,000 | .00050 | .00035 | ..... | ..... | |
| 20,000 | .00090 | .00040 | ..... | ..... | |
| 28,000 | .00120 | .00030 | ..... | ..... | Elastic limit. |
| 29,000 | .00140 | .00020 | ..... | ..... | |
| 30,000 | .00195 | .00055 | ..... | ..... | |
| 31,000 | .00400 | .00205 | ..... | ..... | |
| 32,000 | .00505 | .00105 | ..... | ..... | |
| 33,000 | .00730 | .00225 | ..... | ..... | |
| 81,500 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 81,500 |
| Elastic limit per square inch of original section | do... | 28,000 |
| Elongation per inch after rupture | inch.. | .1400 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .035 |
| Reduction in area after rupture, per cent of original section | | 13.2 |
| Position of rupture | | 1." from neck |
| Character of broken surface | | fine granular, silky, eccentric spot |
| Elongation of inch sections | | ".16*, ".12 |

## No. 6643.

## 3″ Test Plate for 6-pounder Shells.

Marks, $\frac{A_1}{T}$ P 3
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00055 | .00030 | ..... | ..... | |
| 28,000 | .00090 | .00035 | ..... | ..... | |
| 29,000 | .00095 | .00005 | ..... | ..... | Elastic limit. |
| 30,000 | .01250 | .01155 | ..... | ..... | |
| 31,000 | .01350 | .00100 | ..... | ..... | |
| 32,000 | .01450 | .00100 | ..... | ..... | |
| 33,000 | .01550 | .00100 | ..... | ..... | |
| 63,050 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 63,050 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .2250 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .065 |
| Reduction in area after rupture, per cent of original section | | 23.9 |
| Position of rupture | | ″.50 from neck |
| Character of broken surface | | granular, silky spot at circumference |
| Elongation of inch sections | | ″.27*, ″.18 |

## No. 6644.

### 3″ TEST PLATE FOR 6-POUNDER SHELLS.

Marks, $\frac{A}{2T}$ P3
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00025 | .00015 | ..... | ..... | |
| 20,000 | .00060 | .00035 | ..... | ..... | |
| 28,000 | .00090 | .00030 | ..... | ..... | |
| 29,000 | .00095 | .00005 | ..... | ..... | Elastic limit. |
| 30,000 | .01225 | .01130 | ..... | ..... | |
| 31,000 | .01300 | .00075 | ..... | ..... | |
| 32,000 | .01425 | .00125 | ..... | ..... | |
| 33,000 | .01500 | .00075 | ..... | ..... | |
| 34,000 | .01700 | .00200 | ..... | ..... | |
| 62,950 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 62,950 |
| Elastic limit per square inch of original section | do... | 29,000 |
| Elongation per inch after rupture | inch.. | .2700 |
| Elongation per inch under strain at elastic limit | do... | .00095 |
| Reduction in diameter at point of rupture | do... | .105 |
| Reduction in area after rupture, per cent of original section | | 37.1 |
| Position of rupture | | ″.70 from neck |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.20, ″.34* |

## No. 6743.

### 3″ Test Plate for 6-pounder Shells.

Marks, $\frac{S_3}{T\ P\ 2}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00030 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 38,000 | .00130 | .00030 | ..... | ..... | Elastic limit. |
| 39,000 | .00150 | .00020 | ..... | ..... | |
| 40,000 | .00160 | .00010 | ..... | ..... | |
| 41,000 | .00200 | .00040 | ..... | ..... | |
| 42,000 | .00240 | .00040 | ..... | ..... | |
| 43,000 | .00270 | .00030 | ..... | ..... | |
| 44,000 | .00300 | .00030 | ..... | ..... | |
| 45,000 | .00345 | .00045 | ..... | ..... | |
| 46,000 | .00395 | .00050 | ..... | ..... | |
| 104,000 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 104,000 |
| Elastic limit per square inch of original section | do... | 38,000 |
| Elongation per inch after rupture | inch.. | .0900 |
| Elongation per inch under strain at elastic limit | do... | .00130 |
| Reduction in diameter at point of rupture | do... | .025 |
| Reduction in area after rupture, per cent of original section | | 9.5 |
| Position of rupture | | ″.85 from neck |
| Character of broken surface | | granular |
| Elongation of inch sections | | ″.08, ″.10* |

## Cast Iron for Dynamite-Gun Barrels.

### No. 6745.

Marks, $\frac{D\ G_2}{M\ I\ D_2}$
$T_2$

Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 6″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 2,000 | .000067 | .000067 | ..... | ..... | |
| 3,000 | .000133 | .000066 | ..... | ..... | |
| 4,000 | .000217 | .000084 | ..... | ..... | |
| 5,000 | .000300 | .000083 | ..... | ..... | |
| 6,000 | .000383 | .000083 | ..... | ..... | |
| 7,000 | .000467 | .000084 | ..... | ..... | |
| 8,000 | .000550 | .000083 | ..... | ..... | |
| 9,000 | .000633 | .000083 | ..... | ..... | |
| 10,000 | .000733 | .000100 | .000083 | .000083 | |
| 11,000 | .000817 | .000084 | ..... | ..... | |
| 12,000 | .000900 | .000083 | ..... | ..... | |
| 13,000 | .001017 | .000117 | ..... | ..... | |
| 14,000 | .001133 | .000116 | ..... | ..... | |
| 15,000 | .001217 | .000084 | .000133 | .00050 | |
| 16,000 | .001333 | .000116 | ..... | ..... | |
| 17,000 | .001500 | .000167 | ..... | ..... | |
| 18,000 | .001633 | .000133 | ..... | ..... | |
| 19,000 | .001817 | .000184 | ..... | ..... | |
| 20,000 | .002033 | .000216 | .000433 | .0003000 | |
| 21,000 | .002233 | .000200 | ..... | ..... | |
| 22,000 | .002500 | .000267 | ..... | ..... | |
| 23,000 | .002800 | .000300 | ..... | ..... | |
| 24,000 | .003217 | .000417 | ..... | ..... | |
| 25,000 | .003750 | .000533 | .001433 | .00100 | |
| 27,020 | ..... | ..... | ..... | ..... | Tensile strength. |

Fractured at the neck. Appearance, fine granular, light gray.

# CAST IRON FROM WATERTOWN ARSENAL

AND

# PIG IRONS.

1033

The specimens of cast iron were taken from cylinders 18″ long by 8″ diameter, cored 3½″ diameter, poured from the same metal as the castings they represented.

Specimens of pig iron were turned down directly from sample pigs.

The furnace charges were as follows:

The scrap iron used was heads of shot and shell of previous casts, old shot and shell, bolsters and gun carriage scrap of good quality.

| Date of cast. | Furnace charge. | *Pounds.* | Furnace. | No. of tension test. |
|---|---|---|---|---|
| May 18, 1900 | Muirkirk pig | 9,000 | Air | 6395 |
| | Nittany pig | 8,000 | | |
| | Round shot | 4,000 | | |
| | Heads | 2,500 | | |
| | Total | 23,500 | | |
| May 22, 1900 | Muirkirk pig | 1,100 | Cupola | 6394 |
| | Nittany pig | 1,100 | | |
| | Round shot | 9,800 | | |
| | Heads | 500 | | |
| | Total | 12,500 | | |
| May 29, 1900 | Muirkirk pig | 5,000 | Cupola | 6399 |
| | Round shot | 8,000 | | |
| | Heads | 7,000 | | |
| | Total | 20,000 | | |
| May 29, 1900 | Muirkirk pig | 20,000 | Air | 6397 |
| | Nittany pig | 6,000 | | |
| | Round shot | 10,000 | | |
| | Heads | 3,000 | | |
| | Scrap | 1,000 | | |
| | Total | 40,000 | | |
| June 1, 1900 | Muirkirk pig | 14,000 | Air | 6404 |
| | Nittany pig | 4,000 | | |
| | Round shot | 7,000 | | |
| | Heads | 5,000 | | |
| | Total | 30,000 | | |
| June 1, 1900 | Muirkirk pig | 4,000 | Cupola | 6402 |
| | Hard pig | 200 | | |
| | Round shot | 6,000 | | |
| | Heads | 4,000 | | |
| | Total | 14,200 | | |
| June 9, 1900 | Muirkirk pig | 3,200 | Cupola | 6405 |
| | Round shot | 2,000 | | |
| | Heads | 1,600 | | |
| | Total | 6,800 | | |
| June 11, 1900 | Muirkirk pig | 1,600 | Cupola | 6408 |
| | Nittany pig | 400 | | |
| | Round shot | 1,000 | | |
| | Heads | 2,000 | | |
| | Total | 5,000 | | |
| June 11, 1900 | Muirkirk pig | 12,000 | Air | 6409 |
| | Nittany pig | 6,000 | | |
| | Round shot | 3,000 | | |
| | Heads | 2,000 | | |
| | Total | 23,000 | | |
| June 16, 1900 | Muirkirk pig | 4,800 | Cupola | 6410 |
| | Hard pig | 12,000 | | |
| | Heads | 6,000 | | |
| | Total | 22,800 | | |

| Date of cast. | Furnace charge. | | Furnace. | No. of tension test. |
|---|---|---|---|---|
| | | *Pounds.* | | |
| June 16, 1900 | Nittany pig | 5,000 | Air | 6414 |
| | Round shot | 11,000 | | |
| | Heads | 6,000 | | |
| | Total | 22,000 | | |
| June 21, 1900 | Muirkirk pig | 4,000 | Cupola | 6415 |
| | Round shot | 2,000 | | |
| | Heads | 7,000 | | |
| | Scrap | 1,000 | | |
| | Total | 14,000 | | |
| June 23, 1900 | Muirkirk pig | 1,600 | Cupola | 6422 |
| | Hard pig | 400 | | |
| | Round shot | 200 | | |
| | Heads | 2,800 | | |
| | Total | 5,000 | | |
| June 23, 1900 | Muirkirk | 18,000 | Air | 6417 |
| | Nittany pig | 8,000 | | |
| | Round shot | 8,000 | | |
| | Heads | 8,000 | | |
| | Scrap | 8,000 | | |
| | Total | 40,000 | | |
| June 26, 1900 | Muirkirk pig | 1,000 | Cupola | 6418 |
| | Round shot | 2,500 | | |
| | Heads | 4,600 | | |
| | Total | 8,100 | | |
| June 26, 1900 | Muirkirk pig | 14,000 | Air | 6419 |
| | Nittany pig | 7,000 | | |
| | Round shot | 8,000 | | |
| | Heads | 6,000 | | |
| | Total | 30,000 | | |

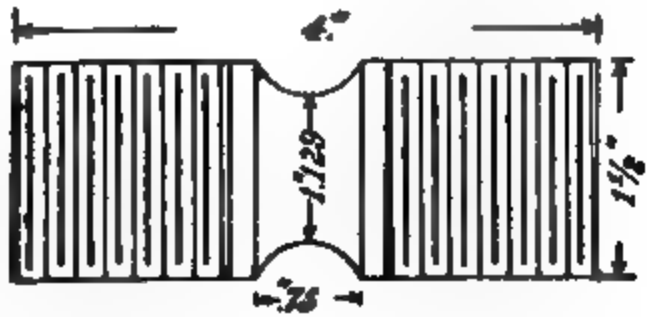
## No. 6582.

Marks, 82.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 5″.
From the same metal as tenacity test No. 6013.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 2,000 | .00008 | .00008 | 0. | ..... | |
| 3,000 | .00014 | .00006 | ..... | ..... | |
| 4,000 | .00020 | .00006 | ..... | ..... | |
| 5,000 | .00028 | .00008 | ..... | ..... | |
| 6,000 | .00036 | .00008 | ..... | ..... | |
| 7,000 | .00044 | .00008 | ..... | ..... | |
| 8,000 | .00052 | .00008 | ..... | ..... | |
| 9,000 | .00060 | .00008 | ..... | ..... | |
| 10,000 | .00068 | .00008 | .00006 | .00006 | |
| 11,000 | .00076 | .00008 | ..... | ..... | |
| 12,000 | .00086 | .00010 | ..... | ..... | |
| 13,000 | .00096 | .00010 | ..... | ..... | |
| 14,000 | .00104 | .00008 | ..... | ..... | |
| 15,000 | .00114 | .00010 | .00014 | .00008 | |
| 16,000 | .00124 | .00010 | ..... | ..... | |
| 17,000 | .00136 | .00012 | ..... | ..... | |
| 18,000 | .00150 | .00014 | ..... | ..... | |
| 19,000 | .00164 | .00014 | ..... | ..... | |
| 20,000 | .00176 | .00012 | .00082 | .00018 | |
| 21,000 | .00194 | .00018 | ..... | ..... | |
| 22,000 | .00210 | .00016 | ..... | ..... | |
| 23,000 | .00226 | .00016 | ..... | ..... | |
| 24,000 | .00256 | .00030 | ..... | ..... | |
| 25,000 | .00278 | .00022 | .00078 | .00046 | |
| 28,180 | ..... | ..... | ..... | ..... | Tensile strength. |

Fractured at the neck. Appearance, fine granular, light gray.

## Chemical Analyses and Tension Tests.




| No. of test. | Description. | Date of cast. | Chemical composition | | | | | | | | Tensile strength per square inch. | Fracture. | Specific gravity. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Carbon. | | | Manganese. | Silicon. | Sulphur. | Phosphorus. | Copper. | | | |
| | | | Total. | Graphitic. | Combined. | | | | | | | | |
| | | 1900. | | | | | | | | | *Pounds.* | | |
| 6012 | 8" shell | | | | | | | | | | 28,400 | Granular, gray | 7.1806 |
| 6361 | 8" shot | | | | | | | | | | 29,120 | Fine granular, light gray, mottled | 7.3653 |
| 6372 | do | | | | | | | | | | 27,400 | do | 7.2070 |
| 6373 | do | | | | | | | | | | 29,360 | do | 7.2917 |
| 6402 | do | June 1 | | | | | | | | | 28,950 | | 7.2310 |
| 6405 | do | June 9 | | | | | | | | | 29,370 | | 7.4036 |
| 6415 | do | June 21 | | | | | | | | | 27,600 | | 7.2853 |
| 6422 | do | June 23 | | | | | | | | | 31,600 | d | 7.2436 |
| 6387 | 10" shot | | | | | | | | | | 27,810 | | 7.3368 |
| 6394 | do | May 22 | | | | | | | | | 28,050 | | 7.2437 |
| 6399 | do | May 29 | | | | | | | | | 30,600 | | |
| 6402 | do | June 1 | | | | | | | | | 28,950 | | 7.2310 |
| 6405 | do | June 9 | | | | | | | | | 29,370 | | 7.4036 |
| 6408 | do | June 11 | | | | | | | | | 28,980 | | 7.2546 |
| 6410 | do | June 16 | | | | | | | | | 28,850 | | 7.1656 |
| 6414 | do | do | | | | | | | | | 29,390 | | 7.2222 |
| 6415 | do | June 21 | | | | | | | | | 27,600 | | 7.2853 |
| 5994 | 12" shot and shell | | | | | | | | | | 32,900 | | 7.2433 |
| 5996 | do | | | | | | | | | | 33,960 | | 7.2812 |
| 5997 | 12" shot | | | | | | | | | | 35,400 | | 7.2518 |
| 5998 | 12" shot and shell | | | | | | | | | | 34,150 | | 7.2129 |
| 5999 | do | | | | | | | | | | 33,400 | | 7.2017 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6009 | ....do | | | | | | | | | | | 33,600 | 7.1967 |
| 6010 | ....do | | | | | | | | | | | 32,500 | 7.3094 |
| 6013 | 12" shot | | | | | | | | | | | 31,720 | 7.1853 |
| 6028 | 12" shot and shell | | | | | | | | | | | 27,410 | 7.1873 |
| 6034 | ....do | | | | | | | | | | | 32,300 | 7.1901 |
| 6041 | 12" shot | | | | | | | | | | | 32,300 | gray 7.1335 |
| 6043 | 12" shot and shell | | | | | | | | | | | 29,400 | 7.1149 |
| 6049 | ....do | | | | | | | | | | | 28,020 | |
| 6072 | ....do | | | | | | | | | | | 29,500 | gray 7.2132 |
| 6082 | 12" shot | | | | | | | | | | | 28,000 | 7.2687 |
| 6111 | 12" shot and shell | | | | | | | | | | | 31,020 | gray 7.1500 |
| 6129 | ....do | | | | | | | | | | | 31,400 | 7.2682 |
| 6140 | ....do | | | | | | | | | | | 32,300 | 7.2040 |
| 6150 | ....do | | | | | | | | | | | 29,500 | 7.2161 |
| 6151 | ....do | | | | | | | | | | | 31,700 | 7.2123 |
| 6152 | ....do | | | | | | | | | | | 30,680 | 7.2046 |
| 6200 | ....do | | | | | | | | | | | 32,020 | 7.1608 |
| 6201 | ....do | | | | | | | | | | | 31,600 | 7.1905 |
| 6202 | 12" shot | | | | | | | | | | | 30,420 | gray 7.2345 |
| 6222 | 12" shot and shell | | | | | | | | | | | 28,900 | 7.2291 |
| 6223 | ....do | | | | | | | | | | | 31,100 | 7.1751 |
| 6230 | ....do | | | | | | | | | | | 30,600 | 7.1225 |
| 6235 | ....do | | | | | | | | | | | 32,780 | 7.2286 |
| 6231 | ....do | | | | | | | | | | | 32,380 | 7.2663 |
| 6234 | ....do | | | | | | | | | | | 31,600 | 7.2791 |
| 6241 | ....do | | | | | | | | | | | 30,980 | 7.2142 |
| 6246 | ....do | | | | | | | | | | | 28,950 | 7.2630 |
| 6247 | ....do | | | | | | | | | | | 32,100 | 7.2780 |
| 6273 | 12" shot | | | | | | | | | | | 28,500 | 7.1673 |
| 6289 | 12" shot and shell | | | | | | | | | | | 32,400 | 7.3595 |
| 6290 | ....do | | | | | | | | | | | 28,450 | , mottled 7.3533 |
| 6294 | ....do | | | | | | | | | | | 30,340 | 7.3224 |
| 6295 | 12" shot | | | | | | | | | | | 29,380 | 7 2892 |
| 6313 | ....do | | | | | | | | | | | 31,600 | 7.2520 |
| 6314 | 12" shot and shell | | | | | | | | | | | 30,450 | 7.2806 |
| 6316 | 12" shot | | | | | | | | | | | 31,200 | gray 7.3590 |
| 6317 | 12" shot and shell | | | | | | | | | | | 31,600 | 7.2769 |
| 6325 | ....do | | | | | | | | | | | 27,400 | 7.4003 |
| 6329 | 12" shot | | | | | | | | | | | 31,700 | gray 7.3251 |
| 6361 | ....do | | | | | | | | | | | 29,120 | gray, mottled 7.3653 |
| 6362 | 12" shot and shell | | | | | | | | | | | 27,790 | 7.4147 |
| 6371 | 12" shot | | | | | | | | | | | 30,100 | 7.2303 |
| 6372 | 12" shot and shell | | | | | | | | | | | 27,400 | , mottled 7.2070 |
| 6378 | ....do | | | | | | | | | | | 29,360 | 7.2917 |
| 6381 | 12" shot | | | | | | | | | | | 27,600 | 7.2443 |
| 6382 | 12" shot and shell | | | | | | | | | | | 29,980 | 7.2389 |
| 6383 | ....do | | | | | | | | | | | 29,920 | 7 2031 |
| 6385 | ....do | | | | | | | | | | | 31,300 | 7.2704 |
| 6386 | ....do | | | | | | | | | | | 26,980 | tled 7.1960 |
| 6387 | 12" shell | | | | | | | | | | | 27,810 | 7.3368 |
| 6394 | ....do | May 22 | | | | | | | | | | 28,050 | gray 7.2497 |
| 6399 | ....do | May 29 | | | | | | | | | | 30,600 | |

## Chemical Analyses and Tension Tests—Continued.

| | | | | | | | | | | | Tensile strength per square inch. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Pounds. | | |
| 6402 | 12" shell | June 1 | | | | | | | | | 28,950 | Fine granular, light gray | 7.2310 |
| 6405 | do | June 9 | | | | | | | | | 29,570 | Granular, gray, mottled | 7.4086 |
| 6408 | do | June 11 | | | | | | | | | 28,960 | Granular, gray | 7.2546 |
| 6410 | do | June 16 | | | | | | | | | 28,850 | do | 7.1656 |
| 6414 | do | do | | | | | | | | | 29,360 | Granular, light gray, mottled | 7.2222 |
| 6415 | do | June 21 | | | | | | | | | 27,600 | do | 7.2858 |
| 6418 | do | June 26 | | | | | | | | | 30,530 | Granular, gray, mottled | 7.3421 |
| 6422 | do | June 28 | | | | | | | | | 31,690 | Fine granular, light gray, mottled | 7.2426 |
| 5995 | 6" disappearing carriage | | | | | | | | | | 34,970 | Fine granular, light gray | 7.2892 |
| 5997 | do | | | | | | | | | | 35,420 | do | 7.2518 |
| 5998 | do | | | | | | | | | | 34,150 | do | 7.2129 |
| 5999 | do | | | | | | | | | | 33,400 | Granular, gray | 7.2017 |
| 6009 | do | | | | | | | | | | 33,600 | do | 7.1967 |
| 6010 | do | | | | | | | | | | 32,500 | do | 7.2094 |
| 6139 | do | | | | | | | | | | 31,400 | Fine granular, light gray | 7.2882 |
| 6200 | 6" disappearing carriage | | | | | | | | | | 32,020 | Granular, light gray | 7.1606 |
| 6223 | do | | | | | | | | | | 31,100 | do | 7.1751 |
| 6230 | do | | | | | | | | | | 30,600 | do | 7.1226 |
| 6241 | do | | | | | | | | | | 30,980 | do | 7.2142 |
| 6247 | do | | | | | | | | | | 32,100 | Fine granular, light gray | 7.2720 |
| 6290 | do | | | | | | | | | | 28,460 | gray, mottled | 7.3383 |
| 6294 | do | | | | | | | | | | 30,340 | gray | 7.3224 |
| 6313 | do | | | | | | | | | | 31,000 | | 7.2520 |
| 5996 | 6" | | | | | | | | | | 34,970 | light gray | 7.2892 |
| 6013 | " | | | | | | | | | | 31,720 | gray | 7.1853 |
| 6128 | " | | | | | | | | | | 31,400 | light gray | 7.2882 |
| 6236 | 1 | | | | | | | | | | 31,600 | gray | 7.1587 |
| 6245 | 1 | | | | | | | | | | 29,900 | | 7.1629 |
| 6328 | 1 | | | | | | | | | | 31,100 | gray | 7.1751 |
| 6231 | " | | | | | | | | | | 32,360 | | 7.2858 |
| 6241 | " | | | | | | | | | | 30,980 | do | 7.2142 |
| 6289 | " | | | | | | | | | | 32,400 | do | 7.3595 |
| 6295 | " | | | | | | | | | | 29,380 | Granular, gray | 7.2892 |
| 6314 | " | | | | | | | | | | 30,450 | Granular, light gray | 7.2805 |
| 6316 | " | | | | | | | | | | 31,200 | Fine granular, light gray | 7.3590 |
| 6317 | " | | | | | | | | | | 31,600 | do | 7.2709 |

| | | |

## Chemical Analyses and Tension Tests—Continued.

### PIG IRONS.

| No. of test | Description | Chemical composition. | | | | | | | | Tensile strength per square inch. | Fracture | Specific gravity. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Carbon. | | | Manganese. | Silicon. | Sulphur. | Phosphorus. | Copper. | | | |
| | | Total. | Graphitic. | Combined. | | | | | | | | |
| | | | | | | | | | | Pounds. | | |
| 5969 | Nittany pig | 3.446 | 2.754 | 0.692 | 0.312 | 4.000 | 0.030 | 0.260 | ..... | 12,190 | Medium and coarse granular, cavity at center ¼" diameter. | ..... |
| 6042 | Nittany pig No. 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 15,100 | ta... | 6.8816 |
| 6130 | .....do | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 14,100 | ..... | ..... |
| 6131 | .....do | 3.299 | 3.272 | 0.027 | 0.300 | 3.224 | 0.012 | 1.009 | ..... | 14,320 | ..... | 6.8741 |
| 6208 | .....do | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 13,490 | r.... | 6.9312 |
| 6400 | .....do | 3.659 | 2.598 | 1.066 | 0.315 | 2.000 | 0.015 | 0.872 | ..... | 13,650 | ..... | ..... |
| 6232 | Emporium pig No. 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 11,820 | r.... | 6.9709 |
| 6233 | Salisbury pig No. 4 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 32,590 | ..... | 7.3320 |
| 6242 | .....do | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 32,220 | .....do | 7.3479 |
| 6321 | Pulaski pig No. 1 | 3.817 | 3.626 | 0.191 | 0.550 | 2.450 | 0.050 | 1.140 | ..... | 12,940 | Coarse and fine granular, brilliant facets. | 7.2338 |
| 6322 | .....do | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 18,990 | .....do | 6.9898 |
| 6377 | Muirkirk pig No. 4 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 28,980 | Fine granular, gray | 7.2566 |
| 6376 | .....do | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 28,390 | .....do | 7.1710 |
| 6420 | Muirkirk pig, pink ends | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 31,390 | .....do | 7.3321 |
| 6421 | Muirkirk pig, red ends | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 26,900 | Granular, gray | 7.2968 |

## *CAST IRON FURNISHED BY PRIVATE PARTIES FOR ORDNANCE MATERIAL.*

| No. of test. | Description. | Marks. | Tensile strength per square inch. | Fracture. |
|---|---|---|---|---|
| | | | *Pounds.* | |
| 6006 | 2-pounder common shell. | Lot 1..... | 15,900 | Fine granular, dark gray. |
| 6007 | .....do..... | Lot 1 ..... | 16,550 | Do. |
| 6008 | .....do..... | Lot 1 ..... | 16,100 | Do. |
| 6016 | .....do..... | L 2 ..... | 17,680 | Do. |
| 6017 | .....do..... | L 8 ..... | 21,190 | Do. |
| 6018 | .....do..... | L 4 ..... | 16,980 | Do. |
| 6019 | .....do..... | L 5 ..... | 22,200 | Do. |
| 6020 | .....do..... | L 6 ..... | 18,870 | Do. |
| 6021 | .....do..... | L 7 ..... | 18,080 | Do. |
| 6022 | .....do..... | L 8 ..... | 17,990 | Do. |
| 6023 | .....do..... | L 9 ..... | 15,980 | Do. |
| 6024 | .....do..... | L 10 ..... | 25,940 | Do. |
| 6025 | .....do..... | L 11 ..... | 20,100 | Do. |
| 6026 | .....do..... | L 12 ..... | 22,650 | Do. |
| 6027 | .....do..... | L 13 ..... | 21,520 | Do. |
| 6029 | .....do..... | L 14 ..... | 25,950 | Fine granular, light gray. |
| 6030 | .....do..... | L 15 ..... | 27,200 | Do. |
| 6031 | .....do..... | L 16 ..... | 27,650 | Do. |
| 6032 | .....do..... | L 17 ..... | 20,020 | Fine granular, darker gray. |
| 6033 | .....do..... | L 18 ..... | 15,600 | Do. |
| 6036 | .....do..... | L 19 ..... | 17,600 | Variable fine granular, light gray. |
| 6037 | .....do..... | L 20 ..... | 26,100 | Fine granular, light gray. |
| 6038 | .....do..... | L 21 ..... | 28,980 | Do. |
| 6039 | .....do..... | L 22 ..... | 23,800 | Do. |
| 6040 | .....do..... | L 23 ..... | 23,400 | Do. |
| 6046 | .....do..... | L 24 ..... | 22,960 | Fine granular, dark gray. |
| 6047 | .....do..... | L 25 ..... | 22,100 | Do. |
| 6048 | .....do..... | L 26 ..... | 21,010 | Do. |
| 6068 | 4-pounder common shell. | C L 1 ..... | 22,450 | Granular, gray. |
| 6069 | .....do..... | C L 2 ..... | 23,350 | Fine granular, gray. |
| 6070 | .....do..... | C L 3 ..... | 27,950 | Do. |
| 6071 | .....do..... | C L 4 ..... | 26,900 | Do. |
| 6061 | 6-pounder common shell. | C L 2 ..... | 32,850 | Fine granular, light gray. |
| 6062 | .....do..... | C L 3 ..... | 25,500 | Fine granular, gray. |
| 6063 | .....do..... | C L 4 ..... | 26,400 | Do. |
| 6064 | .....do..... | C L 5 ..... | 33,950 | Fine granular, light gray. |
| 6065 | .....do..... | C L 6 ..... | 31,450 | Do. |
| 6066 | .....do..... | C L 7 ..... | 30,400 | Do. |
| 6067 | .....do..... | C L 8 ..... | 25,350 | Fine granular, gray. |
| 6091 | .....do..... | C L 13 ..... | 26,000 | Do. |
| 6092 | .....do..... | C L 13 ..... | 26,350 | Do. |
| 6093 | .....do..... | C L 13 ..... | 26,600 | Do. |
| 6094 | .....do..... | C L 14 ..... | 27,450 | Do. |
| 6095 | .....do..... | C L 14 ..... | 27,450 | Do. |
| 6096 | .....do..... | C L 14 ..... | 29,000 | Do. |
| 6097 | .....do..... | C L 15 ..... | 28,350 | Do. |
| 6098 | .....do..... | C L 15 ..... | 28,100 | Do. |
| 6099 | .....do..... | C L 15 ..... | 28,000 | Do. |
| 6100 | .....do..... | C L 16 ..... | 27,950 | Do. |
| 6101 | .....do..... | C L 16 ..... | 27,500 | Do. |
| 6102 | .....do..... | C L 16 ..... | 26,000 | Do. |
| 6103 | .....do..... | C L 17 ..... | 27,000 | Do. |
| 6104 | .....do..... | C L 17 ..... | 31,500 | Fine granular, light gray. |
| 6105 | .....do..... | C L 17 ..... | 29,900 | Do. |
| 6106 | .....do..... | C L 18 ..... | 28,000 | Fine granular, gray. |
| 6107 | .....do..... | C L 18 ..... | 29,450 | Do. |
| 6132 | .....do..... | C L 17-2 .... | 25,600 | Granular, dark gray. |
| 6133 | .....do..... | C L 17-2 .... | 20,550 | Do. |
| 6134 | .....do..... | C L 18-2 .... | 26,900 | Do. |
| 6135 | .....do..... | C L 18-2 .... | 24,800 | Do. |
| 6153 | .....do..... | C L 35 ..... | 29,000 | Fine granular, gray. |
| 6154 | .....do..... | C L 35-2 .... | 26,950 | Do. |
| 6155 | .....do..... | C L 36 ..... | 29,100 | Do. |
| 6156 | .....do..... | C L 36-2 .... | 29,000 | Do. |
| 6157 | .....do..... | C L 37 ..... | 32,000 | Do. |
| 6158 | .....do..... | C L 37-2 .... | 28,450 | Do. |
| 6159 | .....do..... | C L 38 ..... | 32,000 | Do. |
| 6160 | .....do..... | C L 38-2 .... | 30,950 | Do. |
| 6161 | .....do..... | C L 39 ..... | 33,500 | Do. |
| 6162 | .....do..... | C L 39-2 .... | 30,600 | Do. |
| 6277 | .....do..... | C L 55 ..... | 27,950 | Granular, gray. |

## *CAST IRON FURNISHED BY PRIVATE PARTIES FOR ORDNANCE MATERIAL*—Continued.

| No. of test. | Description. | Marks. | Tensile strength per square inch. | Fracture. |
|---|---|---|---|---|
| | | | *Pounds.* | |
| 6278 | 6-pounder common shell. | C L 56 | 28,600 | Granular, gray. |
| 6279 | do | C L 57 | 27,000 | Do. |
| 6280 | do | C L 58 | 25,950 | Do. |
| 6281 | do | C L 59 | 28,400 | Do. |
| 6282 | do | C L 60 | 26,000 | Do. |
| 6283 | do | C L 82 | 31,400 | Do. |
| 6284 | do | C L 84 | 29,450 | Do. |
| 6285 | do | C L 85 | 26,500 | Do. |
| 6286 | do | C L 86 | 29,950 | Do. |
| 6287 | do | C L 88 | 30,100 | Do. |
| 6311 | do | C L 89-1 | 29,950 | Do. |
| 6312 | do | C L 90-2 | 30,000 | Do. |
| 6330 | do | C L 1 | 23,650 | Fine granular, gray, small dark spot at the circumference. |
| 6331 | do | C L 2 | 27,100 | Fine granular, gray. |
| 6332 | do | C L 3 | 30,100 | Do. |
| 6333 | do | C L 4 | 30,650 | Do. |
| 6334 | do | C L 5 | 28,200 | Do. |
| 6335 | do | C L 6 | 29,850 | Do. |
| 6336 | do | C L 7 | 26,150 | Do. |
| 6337 | do | C L 8 | 29,550 | Do. |
| 6338 | do | C L 9 | 25,700 | Do. |
| 6339 | do | C L 10 | 27,550 | Do. |
| 6340 | do | C L 11 | 28,100 | Do. |
| 6341 | do | C L 12 | 24,850 | Do. |
| 6342 | do | C L 13 | 30,650 | Do. |
| 6343 | do | C L 14 | 27,600 | Do. |
| 6344 | do | C L 9-2 | 25,400 | Do. |
| 6345 | do | C L 10-2 | 28,650 | Do. |
| 6346 | do | C L 8-2 | 28,100 | Do. |
| 6084 | 12-pounder common shell. | 1 | 23,870 | Do. |
| 6085 | do | 2 | 22,080 | Do. |
| 6086 | do | 3 | 21,390 | Do. |
| 6087 | do | 4 | 19,980 | Do. |
| 6088 | do | 5 | 19,390 | Do. |
| 6089 | do | 6 | 21,480 | Do. |
| 6090 | do | 7 | 18,400 | Granular, dark gray. |
| 6124 | do | 8 | 17,640 | Do. |
| 6125 | do | 9 | 17,360 | Do. |
| 6126 | do | 10 | 19,980 | Do. |
| 6127 | do | 11 | 19,620 | Do. |
| 6128 | do | 12 | 14,900 | Do. |
| 6137 | do | 13 | 17,100 | Do. |
| 6138 | do | 14 | 16,490 | Do. |
| 6139 | do | 15 | 17,500 | Do. |
| 6141 | do | 16 | 17,220 | Do. |
| 6142 | do | 17 | 18,400 | Do. |
| 6143 | do | 18 | 16,980 | Do. |
| 6148 | do | A | 18,380 | Do. |
| 6149 | do | B | 16,590 | Do. |
| 6174 | do | C | 18,590 | Do. |
| 6175 | do | D | 17,720 | Do. |
| 6176 | do | E | 18,600 | Do. |
| 6177 | do | F | 25,880 | Granular, gray. |
| 6178 | do | G | 21,500 | Do. |
| 6179 | do | H | 20,490 | Do. |
| 6189 | do | I | 21,990 | Granular, dark gray. |
| 6190 | do | K | 19,800 | Do. |
| 6191 | do | L | 17,520 | Do. |
| 6192 | do | M | 19,000 | Do. |
| 6193 | do | N | 16,390 | Do. |
| 6194 | do | O | 21,400 | Do. |
| 6195 | do | P | 23,590 | Granular, gray. |
| 6196 | do | Q | 27,300 | Do. |
| 6197 | do | R | 26,080 | Do. |
| 6198 | do | S | 22,100 | Do. |
| 6199 | do | G | 25,850 | Do. |
| 6204 | do | O | 23,200 | Do. |
| 6205 | do | T | 17,750 | Do. |
| 6206 | do | U | 22,100 | Do. |
| 6207 | do | V | 18,820 | Do. |
| 6218 | do | W | 19,590 | Do. |
| 6219 | do | X | 18,000 | Do. |

## *CAST IRON FURNISHED BY PRIVATE PARTIES FOR ORDNANCE MATERIAL*—Continued.

| No. of test. | Description. | Marks. | Tensile strength per square inch. | Fracture. |
|---|---|---|---|---|
| | | | *Pounds.* | |
| 6220 | 12-pounder common shell. | Y | 19,110 | Granular, gray. |
| 6221 | .....do | Z | 23,380 | Do. |
| 6224 | .....do | $A_1$ | 24,580 | Do. |
| 6225 | .....do | $B_1$ | 22,800 | Do. |
| 6226 | .....do | $C_1$ | 23,390 | Do. |
| 6227 | .....do | $D_1$ | 24,080 | Do. |
| 6228 | .....do | $E_1$ | 22,420 | Do. |
| 6229 | .....do | $F_1$ | 24,390 | Do. |
| 6237 | .....do | $G_1$ | 23,600 | Do. |
| 6238 | .....do | $H_1$ | 20,200 | Do. |
| 6239 | .....do | $I_1$ | 24,600 | Do. |
| 6240 | .....do | $J_1$ | 20,950 | Do. |
| 6243 | .....do | $K_1$ | 23,190 | Do. |
| 6244 | .....do | $L_1$ | 21,600 | Do. |
| 6245 | .....do | $M_1$ | 16,320 | Do. |
| 6248 | .....do | $N_1$ | 29,350 | Do. |
| 6249 | .....do | $O_1$ | 24,600 | Do. |
| 6274 | .....do | $L_1$ | 23,340 | Do. |
| 6275 | .....do | $P_1$ | 23,790 | Do. |
| 6276 | .....do | $Q_1$ | 22,370 | Do. |
| 6000 | 15-pounder common shell. | C L 14 | 23,050 | Fine granular, gray. |
| 6001 | .....do | C L 15 | 27,450 | Do. |
| 6002 | .....do | C L 16 | 25,600 | Do. |
| 6003 | .....do | C L 17 | 27,400 | Do. |
| 6004 | .....do | C L 18 | 27,300 | Do. |
| 6005 | .....do | C L 6 | 25,050 | Do. |
| 6051 | .....do | C L 19 | 23,950 | Do. |
| 6052 | .....do | C L 20 | 26,500 | Do. |
| 6053 | .....do | C L 21 | 27,950 | Do. |
| 6054 | .....do | C L 22 | 29,500 | Do. |
| 6055 | .....do | C L 23 | 23,100 | Do. |
| 6056 | .....do | C L 24 | 21,850 | Granular, gray. |
| 6057 | .....do | C L 25 | 25,950 | Fine granular, gray. |
| 6058 | .....do | C L 27 | 23,400 | Do. |
| 6059 | .....do | C L 28 | 25,500 | Do. |
| 6060 | .....do | C L 29 | 23,950 | Do. |
| 6075 | .....do | C L 30 | 22,350 | Granular, gray. |
| 6076 | .....do | C L 31 | 21,950 | Do. |
| 6077 | .....do | C L 32 | 23,500 | Do. |
| 6078 | .....do | C L 33 | 22,950 | Do. |
| 6079 | .....do | C L 34 | 23,900 | Do. |
| 6080 | .....do | C L 35 | 21,500 | Do. |
| 6081 | .....do | C L 36 | 21,000 | Do. |
| 6112 | .....do | 2 C L 35 | 26,550 | Fine granular, dark gray. |
| 6113 | .....do | 2 C L 36 | 27,800 | Do. |
| 6114 | .....do | C L 37 | 23,800 | Coarse and fine granular, gray. |
| 6115 | .....do | C L 38 | 20,600 | Do. |
| 6116 | .....do | C L 39 | 25,150 | Fine granular, dark gray. |
| 6117 | .....do | C L 40 | 21,650 | Coarse and fine granular, dark gray. |
| 6118 | .....do | C L 41 | 23,100 | Fine granular, dark gray. |
| 6119 | .....do | C L 42 | 25,500 | Do. |
| 6120 | .....do | C L 43 | 22,950 | Do. |
| 6121 | .....do | C L 44 | 26,200 | Do. |
| 6122 | .....do | C L 46 | 24,750 | Do. |
| 6136 | .....do | C L 45 | 21,350 | Granular, dark gray. |
| 6144 | .....do | 2 C L 38 | 24,800 | Do. |
| 6145 | .....do | 3 C L 38 | 23,200 | Do. |
| 6146 | .....do | 2 C L 40 | 19,550 | Do. |
| 6147 | .....do | 3 C L 40 | 20,450 | Do. |
| 6163 | .....do | C L 47 | 22,950 | Granular, gray. |
| 6164 | .....do | C L 48 | 24,400 | Do. |
| 6165 | .....do | C L 49 | 24,950 | Do. |
| 6166 | .....do | C L 50 | 26,500 | Do. |
| 6167 | .....do | C L 51 | 24,500 | Do. |
| 6168 | .....do | C L 52 | 22,450 | Do. |
| 6169 | .....do | C L 53 | 28,000 | Do. |
| 6170 | .....do | C L 54 | 26,950 | Do. |
| 6171 | .....do | C L 55 | 26,000 | Do. |
| 6172 | .....do | C L 56 | 26,100 | Do. |
| 6173 | .....do | C L 57 | 24,900 | Do. |
| 6180 | .....do | C L 58 | 25,950 | Do. |
| 6181 | .....do | C L 59 | 24,500 | Do. |
| 6182 | .....do | C L 60 | 29,000 | Fine granular, gray. |

## *CAST IRON FURNISHED BY PRIVATE PARTIES FOR ORDNANCE MATERIAL*—Continued.

| No. of test. | Description. | Marks. | Tensile strength per square inch. | Fracture. |
|---|---|---|---|---|
| | | | *Pounds.* | |
| 6183 | 15-pounder common shell. | C L 61 | 25,000 | Granular, gray. |
| 6184 | .....do | C L 62 | 27,400 | Do. |
| 6185 | .....do | C L 63 | 22,950 | Do. |
| 6186 | .....do | C L 64 | 22,400 | Do. |
| 6187 | .....do | C L 65 | 25,500 | Do. |
| 6188 | .....do | C L 66 | 23,100 | Do. |
| 6208 | .....do | C L 67 | 24,000 | Do. |
| 6209 | .....do | C L 68 | 23,550 | Do. |
| 6210 | .....do | C L 69 | 25,600 | Coarse and fine granular, gray. |
| 6211 | .....do | C L 70 | 26,000 | Granular, gray. |
| 6212 | .....do | C L 71 | 27,050 | Do. |
| 6213 | .....do | C L 72 | 24,500 | Do. |
| 6214 | .....do | C L 73 | 23,450 | Do. |
| 6215 | .....do | C L 74 | 24,000 | Do. |
| 6216 | .....do | C L 75 | 28,400 | Fine granular, gray. |
| 6217 | .....do | C L 76 | 28,000 | Do. |
| 6250 | .....do | C L 77 | 25,100 | Granular, gray. |
| 6251 | .....do | C L 78 | 24,300 | Do. |
| 6252 | .....do | C L 79 | 26,700 | Do. |
| 6253 | .....do | C L 80 | 24,550 | Do. |
| 6254 | .....do | C L 81 | 26,000 | Do. |
| 6255 | .....do | C L 82 | 23,150 | Do. |
| 6256 | .....do | C L 83 | 23,600 | Do. |
| 6257 | .....do | C L 84 | 24,250 | Do. |
| 6258 | .....do | C L 85 | 25,100 | Do. |
| 6259 | .....do | C L 86 | 24,800 | Do. |
| 6260 | .....do | C L 87 | 23,150 | Do. |
| 6261 | .....do | C L 88 | 24,350 | Do. |
| 6262 | .....do | C L 89 | 25,900 | Do. |
| 6263 | .....do | C L 90 | 26,000 | Do. |
| 6264 | .....do | C L 91 | 25,400 | Do. |
| 6265 | .....do | C L 92 | 25,550 | Do. |
| 6266 | .....do | C L 93 | 24,950 | Do. |
| 6267 | .....do | C L 94 | 25,150 | Do. |
| 6268 | .....do | C L 95 | 24,300 | Do. |
| 6269 | .....do | C L 96 | 23,800 | Do. |
| 6270 | .....do | C L 97 | 24,950 | Do. |
| 6271 | .....do | C L 98 | 22,700 | Do. |
| 6272 | .....do | C L 99 | 23,250 | Do. |
| 6296 | .....do | C L 1 | 28,450 | Do. |
| 6297 | .....do | C L 2 | 26,100 | Do. |
| 6298 | .....do | C L 3 | 28,900 | Do. |
| 6299 | .....do | C L 4 | 25,000 | Do. |
| 6300 | .....do | C L 5 | 26,950 | Do. |
| 6301 | .....do | C L 6 | 26,600 | Do. |
| 6302 | .....do | C L 7 | 26,000 | Do. |
| 6303 | .....do | C L 8 | 27,100 | Do. |
| 6304 | .....do | C L 9 | 27,950 | Do. |
| 6305 | .....do | C L 10 | 23,350 | Do. |
| 6306 | .....do | C L 11 | 27,200 | Do. |
| 6307 | .....do | C L 12 | 29,900 | Do. |
| 6308 | .....do | C L 13 | 25,100 | Do. |
| 6309 | .....do | C L 14 | 21,000 | Granular, gray, sandy spot at circumference. |
| 6310 | .....do | C L 15 | 23,950 | Granular, gray. |
| 6315 | .....do | 2 C L 14 | 24,600 | Fine granular, gray. |
| 6347 | .....do | C L 16 | 21,500 | Do. |
| 6348 | .....do | C L 17 | 21,850 | Do. |
| 6349 | .....do | C L 18 | 21,500 | Do. |
| 6350 | .....do | C L 19 | 25,600 | Do. |
| 6351 | .....do | C L 20 | 18,900 | Do. |
| 6352 | .....do | C L 17-2 | 24,000 | Do. |
| 6353 | .....do | C L 18-2 | 21,450 | Do. |
| 6354 | .....do | C L 19-2 | 24,400 | Do. |
| 6365 | .....do | C L 16-2 | 21,450 | Do. |
| 6366 | .....do | C L 17-2 | 26,500 | Do. |
| 6367 | .....do | C L 18-2 | 24,900 | Do. |
| 6368 | .....do | C L 20-2 | 23,950 | Do. |
| 6369 | .....do | C L 17-3 | 21,500 | Do. |
| 6370 | .....do | C L 18-3 | 26,450 | Do. |
| 6374 | .....do | C L 16 A | 24,100 | Do. |
| 6375 | .....do | C L 16 B | 26,000 | Do. |
| 6376 | .....do | C L 20 D | 23,000 | Do. |
| 6128 | 6″ R. F. shell | A 2 | 31,200 | Fine granular, dark gray. |

## *CAST IRON FURNISHED BY PRIVATE PARTIES FOR ORDNANCE MATERIAL*—Continued.

| No. of test. | Description. | Marks. | Tensile strength per square inch. | Fracture. |
|---|---|---|---|---|
| | | | *Pounds.* | |
| 6236 | Dynamite gun barrel. | D $G_2$ / $T_2$ | 26,790 | Granular, gray. |
| 6318 | Lyle life-saving projectile. | 1 | 24,850 | Fine granular, gray. |
| 6319 | .....do | 2 | 26,100 | Do. |
| 6320 | .....do | 3 | 27,300 | Do. |
| 6323 | .....do | 4 | 23,400 | Granular, gray. |
| 6326 | .....do | 5 | 29,490 | Do. |
| 6327 | .....do | 6 | 28,200 | Do. |
| 6328 | .....do | 7 | 21,820 | Granular, dark gray. |
| 6355 | .....do | 8 | 18,800 | Granular, gray. |
| 6356 | .....do | 9 | 26,280 | Do. |
| 6357 | .....do | 10 | 21,990 | Do. |
| 6358 | .....do | 11 | 24,500 | Do. |
| 6359 | .....do | 12 | 19,580 | Do. |
| 6360 | .....do | 13 | 22,590 | Do. |
| 6363 | .....do | 18 | 25,980 | Do. |
| 6364 | .....do | 19 | 30,100 | Do. |

### MISCELLANEOUS CAST IRONS.

| | | | | |
|---|---|---|---|---|
| 6397 | Front gear tooth forwarded by secretary of Mississippi River Commission. | 3708 | 12,200 | Fine and medium granulation, gray. |
| 6380 | .....do | 3709 | 12,080 | Do. |

### SPECIMENS FROM FRACTURED CRADLE OF 12″ MORTAR CARRIAGE, No. 193, MODEL 1896. MANUFACTURED BY COLUMBUS MACHINE COMPANY.

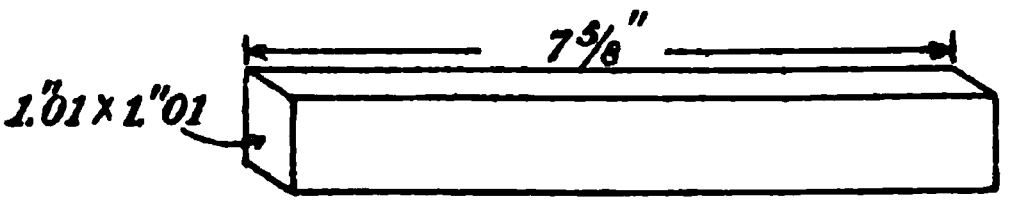
[From Sandy Hook Proving Ground.]

| | | | | |
|---|---|---|---|---|
| 6388 | Specimen from side of 4½″ pin hole opposite fractured surface. | | 28,280 | Granular, gray. |
| 6389 | Specimen from side of 4½″ pin hole next fractured surface. | | 16,900 | Granular, gray, spongy place along middle of stem on one side. |
| 6398 | Specimen from side of 4½″ pin hole on opposite side of fracture, from No. 6389. | | 27,790 | Granular, gray, slightly spongy along side of stem next the original fracture in the cradle. |
| 6411* | Annealed iron..... | 0 | 30,880 | Fine granular, light gray. |

*Specific gravity, 7.2046.

## *CAST IRON FROM A GEAR.*

### TRANSVERSE TESTS FOR MISSISSIPPI RIVER COMMISSION.

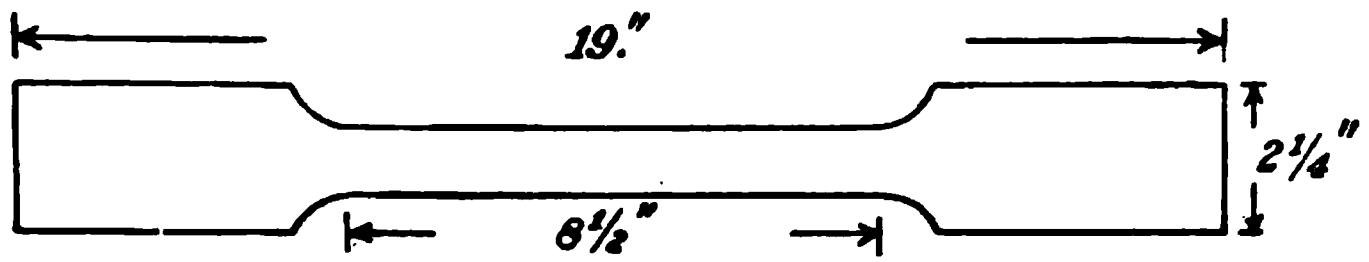



Specimen tested with one fixed end, loaded at the other, 1″ long. Three tests taken successively along the length of the specimen.

| No. of test. | Description. | Ultimate strength. | |
|---|---|---|---|
| | | Total. | Modulus of rupture, R. |
| | | *Pounds.* | *Pounds.* |
| 500 | Center punch mark on tension side | 4,220 | 24,580 |
| 501 | Center punch mark on compression side | 4,280 | 24,930 |
| 502 | Center punch mark on tension side | 4,346 | 25,320 |

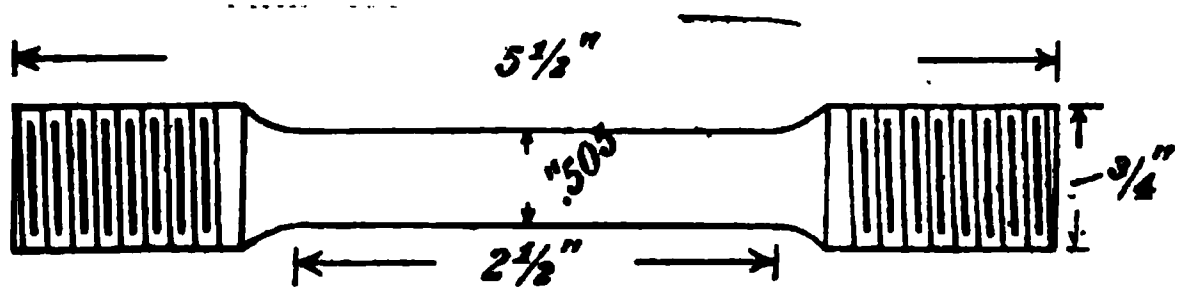
Appearance of fractures, fine granular, with medium granulation next center punch side of the bar.

## NICKEL STEEL BOILER PLATE.



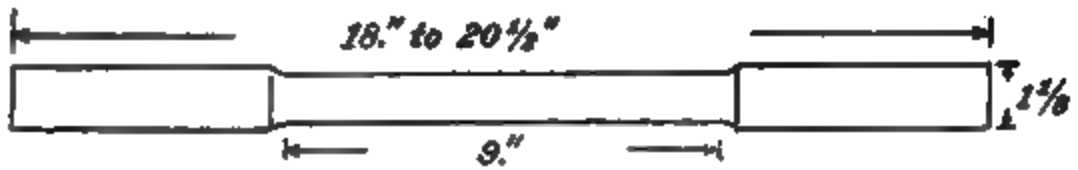

| No. of test. | Mark on specimen. | Dimensions. | | Sectional area. | Elastic limit. | | Ultimate strength. | | Elongation in 8 inches. | | Area at fracture. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Width. | Thickness. | | Total. | Per square inch. | Total. | Per square inch. | | | | | | |
| | | *Inch.* | *Inch.* | *Sq. in.* | *Pounds.* | *Pounds.* | *Pounds.* | *Pounds.* | *In.* | *Per ct.* | *In. In. Sq. in.* | *Per ct.* | | " " " " " " " " |
| 9798 | 1 | .989 | .356 | .352 | 14,600 | 41,480 | 21,760 | 61,820 | 1.95 | 24.4 | .73×.20=.146 | 58.5 | Silky, lamellar | .16, .18, .53*, .25, .22, .21, .21, .19 |
| 9799 | 2 | .989 | .342 | .338 | 14,280 | 42,250 | 20,840 | 61,660 | 2.01 | 25.1 | .72×.19=.137 | 59.5 | Silky | .20, .22, .55*, .26, .22, .21, .18, .17 |
| 9800 | 3 | .991 | .358 | .350 | 14,500 | 41,430 | 21,450 | 61,290 | 1.95 | 24.4 | .73×.21=.153 | 56.3 | Silky, lamellar | .21, .17, .19, .23, .42*, .40*, .18, .15 |
| 9801 | 4 | .991 | .354 | .351 | 14,480 | 41,250 | 21,710 | 61,850 | 1.89 | 23.6 | .73×.21=.153 | 56.4 | .....do | .20, .18, .17, .19, .56*, .26, .18, .15 |
| 9802 | 6 | .989 | .402 | .398 | 18,550 | 46,610 | 25,320 | 63,620 | 2.12 | 26.5 | .79×.28=.161 | 59.5 | Silky | .16, .17, .20, .28, .26, .25, .59*, .21 |

## NICKEL STEEL FROM LOCOMOTIVE PISTON RODS.




| No. of test. | Mark on specimen. | Sectional area. | Elastic limit | | Ultimate strength. | | Elongation in 2 inches. | | Area at fracture. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total. | Per square inch. | Total. | Per square inch. | | | | | | | |
| | | *Sq. in.* | *Pounds.* | *Pounds.* | *Pounds.* | *Pounds.* | *Inch.* | *Per ct.* | *In. Sq. in.* | *Per cent.* | | *"* | *"* |
| 9788 | A | .20 | 11,720 | 58,600 | 15,460 | 77,300 | .54 | 27. | Diam. .31=.075... | 62.5 | Fine silky | .40*, | .14 |
| 9789 | B | .20 | 10,900 | 54,500 | 13,800 | 69,000 | .54 | 27. | Diam. .30=.071... | 62.5 | .....do | .13, | .41* |
| 9790 | C | .20 | 10,100 | 50,500 | 14,600 | 73,000 | .54 | 27. | Diam. .31=.075... | 62.5 | .....do | .11, | .48* |
| 9791 | D | .20 | 9,950 | 49,750 | 14,410 | 72,050 | .54 | 27. | Diam. .31=.075... | 62.5 | .....do | .15, | .39* |
| 9792 | E | .20 | 10,600 | 53,000 | 14,680 | 73,400 | .75 | 37.5 | Diam. .33=.086... | 57. | .....do | .30, | .45* |
| 9793 | F | .20 | 10,500 | 52,500 | 17,100 | 85,500 | .60 | 30. | Diam. .32=.080... | 60. | .....do | .35*, | .25 |
| 9794 | H | .20 | 10,550 | 52,750 | 17,690 | 88,450 | .52 | 26. | Diam. .32=.080... | 60. | .....do | .40*, | .12 |
| 9795 | I | .20 | 11,200 | 56,000 | 17,200 | 86,000 | .59 | 29.5 | Diam. .33=.086... | 57. | .....do | .36*, | .23 |
| 9796 | J | .20 | 10,900 | 54,500 | 15,100 | 75,500 | .41 | 20.5 | Diam. .31=.075... | 62.5 | .....do | .36*, | .05 |
| 9797 | K | .20 | 10,920 | 54,600 | 18,360 | 91,800 | .52 | 26. | Diam. .33=.086... | 57. | .....do | .39*, | .13 |

## STEEL FROM LOCOMOTIVE PISTON ROD.




| No. of test. | Mark on specimen. | Diameter. | Sectional area. | Elastic limit. | | Ultimate strength. | | Elongation in 8 inches. | | Area at fracture. | Contraction of area. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total. | Per square inch. | Total. | Per square inch. | | | | |
| | | *Inches.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Pounds.* | *Pounds.* | *Inches.* | *Per ct.* | *In. Sq. in.* | *Per ct.* |
| 9781 | {Engine 134. | 1.001 | .787 | 25,800 | 32,150 | 58,190 | 73,940 | 1.98 | 24.8 | Diam. .73=.419... | 46.8 |

## STEEL FROM LOCOMOTIVE DRIVING AXLES.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9782 | {Engine 923–8. | 1.006 | .796 | 30,700 | 38,470 | 69,100 | 86,580 | 1.40 | 17.5 | Diam. .81=.515... | 35.5 | {Silky, trace of granulation. | .11, .12, .15, .35*, .27, .18, .13, .14 |
| 9783 | {Engine 923–9. | 1.007 | .796 | 30,850 | 38,760 | 70,200 | 88,190 | 1.38 | 17.3 | Diam. .84=.554... | 30.4 | {Silky, interspersed with granular metal. | .14, .16, .19, .35*, .13, .13, .12, .11 |
| 9784 | {Engine 283–8 | .977 | .750 | 28,200 | 37,600 | 62,650 | 83,530 | 1.49 | 18.6 | Diam. .78=.478... | 36.3 | .....do..... | .27, .38*, .16, .15, .17, .13, .13, .10 |
| 9785 | {Engine 283–9. | 1.002 | .789 | 29,400 | 37,260 | 67,000 | 84,920 | 1.67 | 20.9 | Diam. .82=.528... | 33.1 | .....do..... | .13, .14, .13, .39*, .27, .20, .19, .17 |
| 9786 | {Engine 1428–8. | 1.007 | .796 | 21,300 | 26,760 | 51,900 | 65,200 | 1.51 | 18.9 | Diam. .75=.442... | 44.5 | Silky ..... ..... | .12, .12, .11, .13, .12, .15, .37*, .39* |
| 9787 | {Engine 1428–9. | 1.005 | .793 | 22,400 | 28,250 | 56,100 | 70,740 | 1.68 | 21.0 | Diam. .76=.454... | 42.7 | .....do..... | .14, .15, .14, .16, .16, .19, .42*, .32 |

# STEEL BAR FOR STANDARDIZING TESTING MACHINE AT RARIG ENGINEERING COMPANY.

## No. 6526.

Marks, 3328–1.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00020 | .00010 | ..... | ..... | |
| 20,000 | .00055 | .00035 | ..... | ..... | |
| 30,000 | .00095 | .00040 | 0. | ..... | |
| 35,000 | .00115 | .00020 | ..... | ..... | |
| 40,000 | .00130 | .00015 | ..... | ..... | |
| 50,000 | .00155 | .00025 | ..... | ..... | |
| 51,000 | .00160 | .00005 | ..... | ..... | |
| 52,000 | .00165 | .00005 | ..... | ..... | Elastic limit. |
| 53,000 | .01200 | .01035 | ..... | ..... | |
| 54,000 | .01350 | .00150 | ..... | ..... | |
| 55,000 | .01410 | .00060 | ..... | ..... | |
| 56,000 | .01455 | .00045 | ..... | ..... | |
| 58,000 | .01590 | .00135 | ..... | ..... | |
| 60,000 | .01750 | .00160 | ..... | ..... | |
| 64,000 | .02150 | .00400 | ..... | ..... | |
| 68,000 | .02600 | .00450 | ..... | ..... | |
| 72,000 | .03050 | .00450 | ..... | ..... | |
| 76,000 | .03700 | .00650 | ..... | ..... | |
| 80,000 | .04425 | .00725 | ..... | ..... | |
| 93,350 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 93,350 |
| Elastic limit per square inch of original section | do... | 52,000 |
| Elongation per inch after rupture | inch.. | .2200 |
| Elongation per inch under strain at elastic limit | do... | .00165 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 80.7 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine granular |
| Elongation of inch sections | | ″.20*, ″.24* |

## No. 6527.

Marks, 3328–4.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00020 | .00015 | ..... | ..... | |
| 20,000 | .00055 | .00035 | ..... | ..... | |
| 30,000 | .00095 | .00040 | 0. | ..... | |
| 40,000 | .00125 | .00030 | ..... | ..... | |
| 50,000 | .00165 | .00040 | ..... | ..... | Elastic limit. |
| | .01300 | .01135 | ..... | ..... | |
| 51,000 | .01320 | .00020 | ..... | ..... | |
| 52,000 | .01350 | .00030 | ..... | ..... | |
| 53,000 | .01495 | .00145 | ..... | ..... | |
| 54,000 | .01530 | .00035 | ..... | ..... | |
| 56,000 | .01710 | .00180 | ..... | ..... | |
| 58,000 | .01875 | .00165 | ..... | ..... | |
| 60,000 | .02145 | .00270 | ..... | ..... | |
| 64.000 | .02600 | .00455 | ..... | ..... | |
| 68,000 | .03100 | .00500 | ..... | ..... | |
| 72,000 | .03700 | .00600 | ..... | ..... | |
| 76,000 | .04450 | .00750 | ..... | ..... | |
| 80,000 | .05600 | .01150 | ..... | ..... | |
| 90,150 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 90,150 |
| Elastic limit per square inch of original section | do... | 50,000 |
| Elongation per inch after rupture | inch.. | .2050 |
| Elongation per inch under strain at elastic limit | do... | .00165 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine granular 70 per cent, silky 30 per cent |
| Elongation of inch sections | | ″.21*, ″.20* |

## No. 6528.

Marks, 3328–7.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00005 | .00005 | 0. | ..... | |
| 10,000 | .00020 | .00015 | ..... | ..... | |
| 20,000 | .00055 | .00035 | ..... | ..... | |
| 30,000 | .00095 | .00040 | ..... | ..... | |
| 40,000 | .00125 | .00030 | 0. | ..... | |
| 50,000 | .00165 | .00040 | ..... | ..... | Elastic limit. |
| | .01000 | .00835 | ..... | ..... | |
| 51,000 | .01045 | .00045 | ..... | ..... | |
| 52,000 | .01085 | .00040 | ..... | ..... | |
| 53,000 | .01135 | .00050 | ..... | ..... | |
| 54,000 | .01190 | .00055 | ..... | ..... | |
| 56,000 | .01390 | .00200 | ..... | ..... | |
| 58,000 | .01500 | .00110 | ..... | ..... | |
| 60,000 | .01660 | .00160 | ..... | ..... | |
| 64,000 | .02050 | .00390 | ..... | ..... | |
| 68,000 | .02450 | .00400 | ..... | ..... | |
| 72,000 | .03000 | .00550 | ..... | ..... | |
| 76,000 | .03500 | .00500 | ..... | ..... | |
| 80,000 | .04150 | .00650 | ..... | ..... | |
| 95,450 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 95,450 |
| Elastic limit per square inch of original section | do... | 50,000 |
| Elongation per inch after rupture | inch.. | .2050 |
| Elongation per inch under strain at elastic limit | do... | .00165 |
| Reduction in diameter at point of rupture | do... | .085 |
| Reduction in area after rupture, per cent of original section | | 30.7 |
| Position of rupture | | ″.9 from neck |
| Character of broken surface | | silky 70 per cent, granular 30 per cent |
| Elongation of inch sections | | ″.16, ″.25* |

## No. 6529.

Marks, 3329–1.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00095 | .00035 | ..... | ..... | |
| 40,000 | .00130 | .00035 | 0. | ..... | |
| 48,000 | .00160 | .00030 | ..... | ..... | |
| 49,000 | .00165 | .00005 | ..... | ..... | Elastic limit. |
| 50,000 | .00350 | .00185 | ..... | ..... | |
| 51,000 | .01450 | .01100 | ..... | ..... | |
| 52,000 | .01500 | .00050 | ..... | ..... | |
| 54,000 | .01665 | .00165 | ..... | ..... | |
| 56,000 | .01900 | .00235 | ..... | ..... | |
| 58,000 | .02100 | .00200 | ..... | ..... | |
| 60,000 | .02400 | .00300 | ..... | ..... | |
| 64,000 | .02925 | .00525 | ..... | ..... | |
| 68,000 | .03475 | .00550 | ..... | ..... | |
| 72,000 | .04200 | .00725 | ..... | ..... | |
| 87,300 | ..... | ..... | ..... | ..... | Tensile strength. |

### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 87,300 |
| Elastic limit per square inch of original section | do... | 49,000 |
| Elongation per inch after rupture | inch.. | .2350 |
| Elongation per inch under strain at elastic limit | do... | .00165 |
| Reduction in diameter at point of rupture | do... | .125 |
| Reduction in area after rupture, per cent of original section | | 43.3 |
| Position of rupture | | ″.75 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ″.33*, ″.14 |

Marks, 3329–4.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00080 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 40,000 | .00135 | .00035 | 0. | ..... | |
| 49,000 | .00160 | .00025 | ..... | ..... | |
| 50,000 | .00165 | .00005 | ..... | ..... | Elastic limit. |
| | .01350 | .01185 | ..... | ..... | |
| 51,000 | .01380 | .00030 | ..... | ..... | |
| 52,000 | .01410 | .00030 | ..... | ..... | |
| 53,000 | .01500 | .00090 | ..... | ..... | |
| 54,000 | .01600 | .00100 | ..... | ..... | |
| 56,000 | .01760 | .00160 | ..... | ..... | |
| 58,000 | .02015 | .00255 | ..... | ..... | |
| 60,000 | .02300 | .00285 | ..... | ..... | |
| 64,000 | .02750 | .00450 | ..... | ..... | |
| 68,000 | .03350 | .00600 | ..... | ..... | |
| 72,000 | .04000 | .00650 | ..... | ..... | |
| 76,000 | .05000 | .01000 | ..... | ..... | |
| 80,000 | .06250 | .01250 | ..... | ..... | |
| 88,450 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds | 88,450 |
| Elastic limit per square inch of original section | do | 50,000 |
| Elongation per inch after rupture | inch | .2400 |
| Elongation per inch under strain at elastic limit | do | .00165 |
| Reduction in diameter at point of rupture | do | .125 |
| Reduction in area after rupture, per cent of original section | | 43.8 |
| Position of rupture | | ″.8 from neck |
| Character of broken surface | | fine silky |
| Elongation of inch sections | | ″.16, ″.32* |

## No. 6531.

Marks, 3329–7
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0 | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 40,000 | .00135 | .00035 | 0. | ..... | |
| 47,000 | .00155 | .00020 | ..... | ..... | Elastic limit. |
| 48,000 | .00300 | .00145 | ..... | ..... | |
| | .01300 | .01000 | ..... | ..... | |
| 49,000 | .01330 | .00030 | ..... | ..... | |
| 50,000 | .01370 | .00040 | ..... | ..... | |
| 51,000 | .01440 | .00070 | ..... | ..... | |
| 52,000 | .01550 | .00110 | ..... | ..... | |
| 54,000 | .01750 | .00200 | ..... | ..... | |
| 56,000 | .01950 | .00200 | ..... | ..... | |
| 58,000 | .02150 | .00200 | ..... | ..... | |
| 60,000 | .02400 | .00250 | ..... | ..... | |
| 64,000 | .02925 | .00525 | ..... | ..... | |
| 68,000 | .03600 | .00675 | ..... | ..... | |
| 72,000 | .04400 | .00800 | ..... | ..... | |
| 76,000 | .05500 | .01100 | ..... | ..... | |
| 80,000 | .07000 | .01500 | ..... | ..... | |
| 86,600 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 86,600 |
| Elastic limit per square inch of original section | do... | 47,000 |
| Elongation per inch after rupture | inch.. | .2200 |
| Elongation per inch under strain at elastic limit | do... | .00155 |
| Reduction in diameter at point of rupture | do... | .095 |
| Reduction in area after rupture, per cent of original section | | 34.0 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | silky |
| Elongation of inch sections | | ″.20*, ″.24* |

# COLD-ROLLED STEEL FOR STANDARDIZING TESTING MACHINE AT. WORKS OF AMERICAN ORDNANCE COMPANY.

## No. 6953.

**Marks No. 1.**
**Diameter, ″.564.**
**Sectional area, .25 square inch.**
**Gauged length, 2″.**

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00095 | .00035 | ..... | ..... | |
| 40,000 | .00130 | .00035 | 0. | ..... | |
| 50,000 | .00160 | .00030 | ..... | ..... | |
| 60,000 | .00200 | .00040 | ..... | ..... | |
| 70,000 | .00245 | .00045 | ..... | ..... | |
| 72,000 | .00260 | .00015 | ..... | ..... | Elastic limit. |
| 73,000 | .00300 | .00040 | ..... | ..... | |
| 74,000 | .00340 | .00040 | ..... | ..... | |
| 75,000 | .00410 | .00070 | ..... | ..... | |
| 76,000 | .00505 | .00095 | ..... | ..... | |
| 78,000 | .00975 | .00470 | ..... | ..... | |
| 80,000 | .01250 | .00275 | ..... | ..... | |
| 85,280 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 85,280 |
| Elastic limit per square inch of original section | do... | 72,000 |
| Elongation per inch after rupture | inch.. | .2050 |
| Elongation per inch under strain at elastic limit | do... | .00260 |
| Reduction in diameter at point of rupture | do... | .204 |
| Reduction in area after rupture, per cent of original section | | 59.3 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.14, ″.27* |

## No. 6954.

Marks, No. 3.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 40,000 | .00140 | .00040 | ..... | ..... | |
| 50,000 | .00170 | .00030 | ..... | ..... | |
| 60,000 | .00205 | .00035 | 0. | ..... | |
| 70,000 | .00250 | .00045 | ..... | ..... | |
| 73,000 | .00265 | .00015 | ..... | ..... | Elastic limit. |
| 74,000 | .00285 | .00020 | ..... | ..... | |
| 75,000 | .00305 | .00020 | ..... | ..... | |
| 76,000 | .00335 | .00030 | ..... | ..... | |
| 77,000 | .00350 | .00015 | ..... | ..... | |
| 78,000 | .00450 | .00100 | ..... | ..... | |
| 79,000 | .00600 | .00150 | ..... | ..... | |
| 80,000 | .01200 | .00600 | ..... | ..... | |
| 84,480 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 84,480 |
| Elastic limit per square inch of original section | do... | 73,000 |
| Elongation per inch after rupture | inch.. | .1900 |
| Elongation per inch under strain at elastic limit | do... | .00265 |
| Reduction in diameter at point of rupture | do... | .194 |
| Reduction in area after rupture, per cent of original section | | 57.0 |
| Position of rupture | | 1″ from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.29*, ″.09 |

## No. 6955.

Marks, No. 5.
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 2".

| Applied loads per square inch | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00030 | .00020 | ..... | ..... | |
| 20,000 | .00060 | .00030 | ..... | ..... | |
| 30,000 | .00095 | .00035 | ..... | ..... | |
| 40,000 | .00135 | .00040 | ..... | ..... | |
| 50,000 | .00160 | .00025 | ..... | ..... | |
| 60,000 | .00195 | .00035 | 0. | ..... | |
| 70,000 | .00240 | .00045 | ..... | ..... | |
| 74,000 | .00260 | .00020 | ..... | ..... | Elastic limit. |
| 75,000 | .00290 | .00030 | ..... | ..... | |
| 76,000 | .00330 | .00040 | ..... | ..... | |
| 77,000 | .00355 | .00025 | ..... | ..... | |
| 78,000 | .00500 | .00145 | ..... | ..... | |
| 79,000 | .00675 | .00175 | ..... | ..... | |
| 80,000 | .01325 | .00650 | ..... | ..... | |
| 85,280 | ..... | ..... | ..... | ..... | Tensile strength. |

## No. 6956.

Marks, No. 7.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00060 | .00025 | ..... | ..... | |
| 30,000 | .00100 | .00040 | ..... | ..... | |
| 40,000 | .00135 | .00035 | ..... | ..... | |
| 50,000 | .00170 | .00035 | ..... | ..... | |
| 60,000 | .00200 | .00030 | 0. | ..... | |
| 70,000 | .00245 | .00045 | ..... | ..... | |
| 74,000 | .00265 | .00020 | ..... | ..... | Elastic limit |
| 75,000 | .00295 | .00030 | ..... | ..... | |
| 76,000 | .00310 | .00015 | ..... | ..... | |
| 77,000 | .00340 | .00030 | ..... | ..... | |
| 78,000 | .00400 | .00060 | ..... | ..... | |
| 79,000 | .00460 | .00060 | ..... | ..... | |
| 80,000 | .01015 | .00555 | ..... | ..... | |
| 85,040 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 85,040 |
| Elastic limit per square inch of original section | do... | 74,000 |
| Elongation per inch after rupture | inch.. | .1950 |
| Elongation per inch under strain at elastic limit | do... | .00265 |
| Reduction in diameter at point of rupture | do... | .204 |
| Reduction in area after rupture, per cent of original section | | 59.3 |
| Position of rupture | | at middle of stem |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.20*, ″.19* |

## No. 6957.

**Marks, No. 9.**
**Diameter, ″.564.**
**Sectional area, .25 square inch.**
**Gauged length, 2″.**

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 5,000 | .00010 | .00010 | 0. | ..... | |
| 10,000 | .00035 | .00025 | ..... | ..... | |
| 20,000 | .00065 | .00030 | ..... | ..... | |
| 30,000 | .00100 | .00035 | ..... | ..... | |
| 40,000 | .00135 | .00035 | ..... | ..... | |
| 50,000 | .00165 | .00030 | ..... | ..... | |
| 60,000 | .00200 | .00035 | 0. | ..... | |
| 70,000 | .00245 | .00045 | ..... | ..... | |
| 73,000 | .00255 | .00010 | ..... | ..... | |
| 74,000 | .00270 | .00015 | ..... | ..... | Elastic limit. |
| 75,000 | .00295 | .00025 | ..... | ..... | |
| 76,000 | .00310 | .00015 | ..... | ..... | |
| 77,000 | .00335 | .00025 | ..... | ..... | |
| 78,000 | .00410 | .00075 | ..... | ..... | |
| 79,000 | .00515 | .00105 | ..... | ..... | |
| 80,000 | .01000 | .00485 | ..... | ..... | |
| 85,200 | ..... | ..... | ..... | ..... | Tensile strength. |

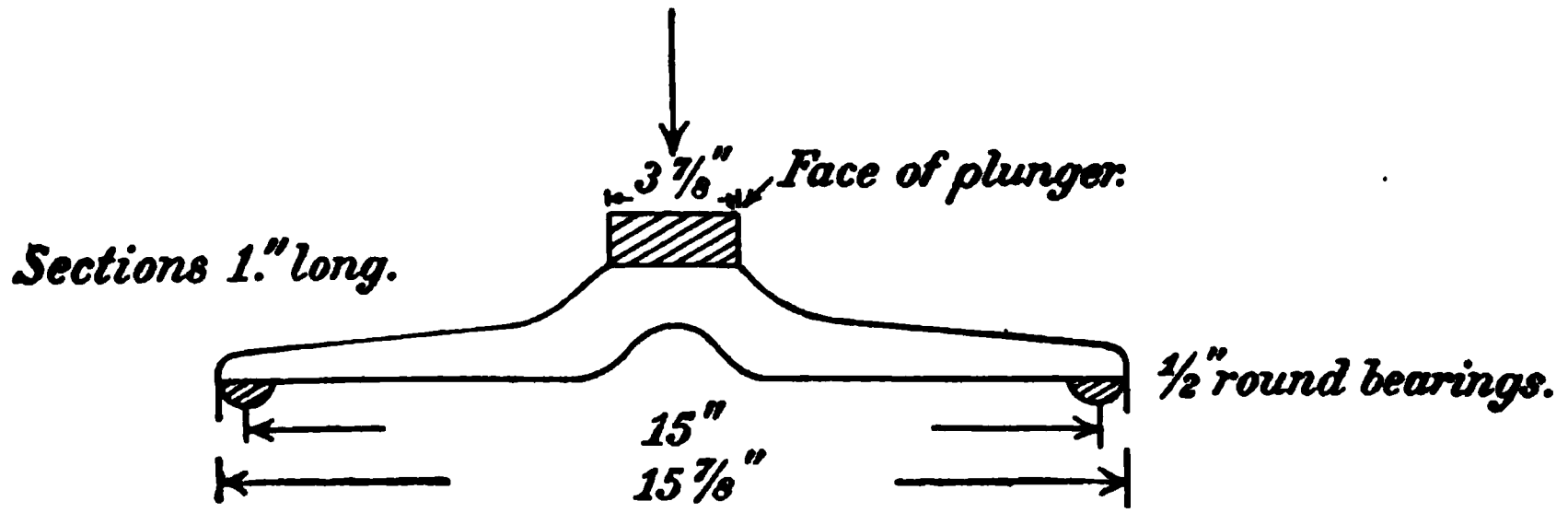
### *General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 85,200 |
| Elastic limit per square inch of original section | do... | 74,000 |
| Elongation per inch after rupture | inch.. | .1950 |
| Elongation per inch under strain at elastic limit | do... | .00270 |
| Reduction in diameter at point of rupture | do... | .204 |
| Reduction in area after rupture, per cent of original section | | 59.3 |
| Position of rupture | | 1″.1 from neck |
| Character of broken surface | | fine silky, cup shaped |
| Elongation of inch sections | | ″.28*, ″.11 |

## Tension Tests.

| No. of test. | Mark on specimen | Diameter. | Sectional area | Elastic limit. | | Ultimate strength. | | Elongation in 2 inches. | | Area of fracture. | Contraction of area. | Appearance of fracture | Elongation of inch sections. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total. | Per square inch. | Total. | Per square inch. | | | | | | |
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Pounds.* | *Pounds.* | *Inches.* | *Per ct.* | *In. Sq. in.* | *Per cent.* | | |
| 9709 | $A_1$ | .505 | .20 | 8,700 | 43,500 | 17,200 | 86,000 | .20 | 10.0 | Diam., .47 = .173 | 13.5 | Granular | *.11*, *.09 |
| 9710 | $A_2$ | .505 | .20 | 8,950 | 44,750 | 12,020 | 60,100 | .06 | 3.0 | Diam., .48 = .181 | 9.5 | Granular, flaky spot at circumference | .04*, .02 |
| 9711 | $A_3$ | .505 | .20 | 9,040 | 45,200 | 17,510 | 87,550 | .21 | 10.5 | Diam., .47 = .173 | 13.5 | Granular, silky spot at circumference | 12*, .09 |
| 9712 | $A_4$ | .505 | .20 | 9,500 | 47,500 | 17,200 | 86,000 | .17 | 8.5 | Diam., .48 = .181 | 9.5 | Granular | .06, .09* |
| 9713 | $A_5$ | .505 | .20 | 9,620 | 48,100 | 17,250 | 86,250 | .16 | 8.0 | Diam., .48 = .181 | 9.5 | do | .09*, .07 |
| 9714 | $A_6$ | .505 | .20 | 9,100 | 45,500 | 13,350 | 66,750 | .09 | 4.5 | Diam., .49 = .189 | 5.5 | Granular, spongy streak | .03, .06* |
| 9715 | $A_7$ | .505 | .20 | 9,700 | 48,500 | 16,580 | 82,900 | .12 | 6.0 | Diam., .48 = .181 | 9.5 | Granular | .08*, .04 |
| 9716 | $A_8$ | .505 | .20 | 8,200 | 41,000 | 10,300 | 51,500 | .06 | 3.0 | Diam., .49 = .189 | 5.5 | Granular 15 per cent, dark spongy | .05*, .01 |
| 9717 | $B_1$ | .505 | .20 | 8,100 | 40,500 | 16,100 | 80,500 | .17 | 8.5 | Diam., .48 = .181 | 9.5 | [illegible] | .10*, .07 |
| 9718 | $B_2$ | .505 | .20 | 8,420 | 42,100 | 15,500 | 77,500 | .13 | 6.5 | Diam., .48 = .181 | 9.5 | [illegible] | .06, .07* |
| 9719 | $B_3$ | .505 | .20 | 8,060 | 40,300 | 15,020 | 75,100 | .11 | 5.5 | Diam., .48 = .181 | 9.5 | [illegible] | .06*, .05* |
| 9720 | $B_4$ | .505 | .20 | 8,850 | 44,250 | 16,920 | 84,600 | .20 | 10.0 | Diam., .47 = .173 | 13.5 | [illegible] | .12*, .08 |
| 9721 | $B_5$ | .505 | .20 | 8,200 | 41,000 | 16,200 | 81,000 | .18 | 9.0 | Diam., .47 = .173 | 13.5 | [illegible] | .10*, .08 |
| 9722 | $B_6$ | .505 | .20 | 7,850 | 39,250 | 10,900 | 54,500 | .05 | 2.5 | Diam., .50 = .196 | 2.0 | [illegible] | .02, .08* |
| 9723 | $B_7$ | .505 | .20 | 8,300 | 41,500 | 16,660 | 83,300 | .20 | 10.0 | Diam., .47 = .173 | 13.5 | [illegible] | .09, .11* |
| 9724 | $B_8$ | .505 | .20 | 6,100 | 30,500 | 6,500 | 32,500 | .04 | 2.0 | Diam., .50 = .196 | 2.0 | Granular 15 per cent, dark colored spongy 85 per cent. | .01, .03* |
| 9725 | OB | .505 | .20 | 8,680 | 43,400 | 17,100 | 85,500 | .21 | 10.5 | Diam., .47 = .173 | 13.5 | Granular, silky spot at circumference | .12*, .09 |

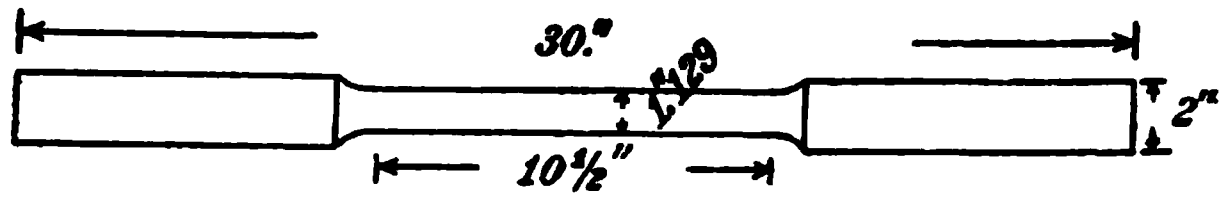
## Transverse Tests of Sections of Rails.




| Applied loads. | Deflections. Marks on sections. | | | | | | | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|
| | $A_9$ center. | $A_{10}$ center. | $A_{11}$ center. | $B_9$ center. | $B_{10}$ center. | $B_{11}$ center. | $A_{12}$ end. | $B_{12}$ end. | |
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 200 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | Initial load. |
| 500 | .02 | .01 | .01 | 0. | 0. | .01 | .01 | .01 | |
| 1,000 | .04 | .02 | .03 | .02 | .01 | .02 | .03 | .02 | |
| 200 | .01 | 0. | .01 | 0. | 0. | 0. | 0. | 0. | |
| 1,500 | .06 | .04 | .04 | .03 | .03 | .03 | .04 | .04 | |
| 2,000 | .07 | .05 | .07 | .05 | .04 | .05 | .05 | .06 | |
| 200 | .01 | .01 | .01 | 0. | 0. | .01 | 0. | 0. | |
| 2,500 | .10 | .07 | .11 | .07 | .07 | .08 | .07 | .08 | |
| 2,800 | ..... | ..... | Fractured, spongy metal. | ..... | ..... | ..... | ..... | ..... | |
| 3,000 | .12 | .09 | ..... | .18 | .11 | .11 | .09 | .11 | |
| 200 | .03 | .01 | ..... | .05 | .05 | .01 | .01 | .03 | |
| 3,100 | .14 | ..... | ..... | .14 | .14 | .15 | .10 | .14 | |
| 3,200 | .15 | .10 | ..... | .15 | .15 | .17 | .11 | .15 | |
| 3,300 | .17 | .12 | ..... | .17 | .16 | .19 | .12 | .18 | |
| 3,400 | .21 | .14 | ..... | .18 | .17 | .20 | .13 | .22 | |
| 3,500 | .25 | .18 | ..... | .19 | .19 | .22 | .14 | .26 | |
| 3,600 | .29 | .21 | ..... | .21 | .21 | .24 | .15 | .31 | |
| 3,700 | .34 | .24 | ..... | .24 | .25 | .26 | .15+ | .36 | |
| 3,800 | .39 | .29 | ..... | .27 | .28 | .29 | .16 | .41 | |
| 3,900 | .46 | .34 | ..... | .29 | .32 | .31 | .17 | .47 | |
| 4,000 | .52 | .39 | ..... | .33 | .35 | .36 | .19 | .54 | |
| 200 | .39 | .28 | ..... | .24 | .25 | .26 | .09 | .46 | |

## *WROUGHT IRON BAR FROM ARSENAL SMITH SHOP.*

### SPECIMEN TURNED DOWN FROM A BAR 2⅛ INCHES DIAMETER.




| No. of test. | Diameter. | Sectional area. | Elastic limit. | | Ultimate strength. | | Elongation in 10 inches. | | Area at fracture. | Contraction of area. | Appearance of fracture. | Elongation of inch sections. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total. | Per square inch. | Total. | Per square inch. | | | | | | |
| | *Inches.* | *Sq. inch.* | *Pounds.* | *Pounds.* | *Pounds.* | *Pounds.* | *Inches.* | *Per cent.* | *In. Sq. in.* | *Per cent.* | | |
| 9677 | 1.129 | 1.00 | ..... | 27,200 | ..... | 47,400 | 1.20 | 12.0 | Diam., 1.00=.785 | 21.5 | Fibrous seamy. Opened cracks along surface of stem. | ".08, ".09, ".09, ".10, ".10, ".12, ".18, ".12, ".18, ".24*. |

# BRONZE.

## Bronze Firing-Valve Bushing for Dynamite Gun.

### No. 6627.

Marks, F. V. B. 8.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 2″.

| Applied loads per square inch. | Elongation per inch. | Successive elongation per inch. | Permanent set. | Successive permanent set. | Remarks. |
|---|---|---|---|---|---|
| *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,000 | 0. | 0. | 0. | 0. | Initial load. |
| 2,000 | .00005 | .00005 | 0. | ..... | |
| 3,000 | .00015 | .00010 | ..... | ..... | |
| 4,000 | .00025 | .00010 | ..... | ..... | |
| 5,000 | .00030 | .00005 | ..... | ..... | |
| 6,000 | .00040 | .00010 | ..... | ..... | |
| 7,000 | .00050 | .00010 | ..... | ..... | |
| 8,000 | .00060 | .00010 | ..... | ..... | |
| 9,000 | .00070 | .00010 | ..... | ..... | |
| 10,000 | .00080 | .00010 | ..... | ..... | |
| 11,000 | .00090 | .00010 | ..... | ..... | |
| 12,000 | .00105 | .00015 | ..... | ..... | |
| 13,000 | .00120 | .00015 | ..... | ..... | Elastic limit. |
| 14,000 | .00140 | .00020 | ..... | ..... | |
| 15,000 | .00170 | .00030 | .00045 | .00045 | |
| 16,000 | .00225 | .00055 | ..... | ..... | |
| 17,000 | .00325 | .00100 | ..... | ..... | |
| 18,000 | .00485 | .00160 | ..... | ..... | |
| 19,000 | .00800 | .00315 | ..... | ..... | |
| 20,000 | .01125 | .00325 | ..... | ..... | |
| 24,240 | ..... | ..... | ..... | ..... | Tensile strength. |

*General summary.*

| | | |
|---|---|---|
| Tensile strength per square inch of original section | pounds.. | 24,240 |
| Elastic limit per square inch of original section | do... | 13,000 |
| Elongation per inch after rupture | inch.. | .0550 |
| Elongation per inch under strain at elastic limit | do... | .00120 |
| Reduction in diameter at point of rupture | do... | .018 |
| Reduction in area after rupture, per cent of original section | | 2.4 |
| Position of rupture | | ″.25 from neck |
| Character of broken surface | | brownish-lavender colored |

| Description. | Marks. | Diameter. | Sectional area. | Tensile strength per square inch. | Elongation. | Contraction of area. | Fracture. |
|---|---|---|---|---|---|---|---|
| | | *Inch* | *Sq. in.* | *Pounds.* | *Per cent.* | *Per cent* | |
| Cylinder 5" barbette carriage | | .564 | .25 | 27,560 | 14.5 | 15.2 | |
| Do | | .564 | .25 | 32,400 | 18.0 | 21.6 | |
| Elevating rack | No. 3 Bs | .564 | .25 | 28,880 | 9.3 | 18.4 | colored, spongy. |
| Do | No. 2 Bs | .564 | .25 | 30,840 | 20.3 | 21.6 | |
| Recoil buffer, 10" disappearing carriage No. 15, from Fort Greble. | | .505 | .20 | 24,500 | 6.0 | 9.5 | Dark brown, copper colored, light yellow spot at the circumference. |
| Counter recoil buffer, 12" disappearing carriage. | | .564 | .25 | 46,040 | 36.0 | 44.6 | Uniform light yellow. |
| Recoil buffer, 12" disappearing carriage, No. 24, North Point. | Poole No. 3 Bs. | 1.129 | 1.00 | 6,420 | Not appreciable... | | wn, spongy. |
| | ....do | 1.129 | 1 00 | 7,450 | .....do | | |
| Lyle life-saving gun | North Point | .798 | .50 | 15,000 | 6.0 | 4.4 | olored, spongy. |
| Nuts, 12" disappearing carriage | L L S G No. 2. | .798 | 50 | 48,440 | 36.5 | 31.6 | Hardness = 4.51.* |
| No. 2 bronze | No. 3 Bs | .798 | .50 | 29,400 | 8.0 | 14.0 | intermingled. |
| Do | | .564 | .25 | 29,200 | 14.7 | 21.6 | w. |
| Do | 4 | .564 | .25 | 30,840 | 23.0 | 21.6 | |
| No. 3 bronze | 6 | .564 | .25 | 32,280 | 22.0 | 30.8 | |
| | | .564 | .25 | 42,000 | 8.7 | 18.4 | Light yellow. |

MANGANESE BRONZE.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | .... ..... | .564 | .25 | 72,880 | 38.0 | 44.8 | Uniform light yellow. |
| | ..... | .564 | .25 | 73,200 | 38.3 | 44.8 | Do. |
| | No. 1 | .798 | .50 | 73,900 | 34.7 | 35.6 | Do. |
| rriage. | | | | | | | |
| Do | No. 2 | .798 | .50 | 69,000 | 37.7 | 39.6 | Do. |
| Do | No. 3 | .798 | .50 | 72,800 | 38.0 | 37.6 | Do. |

# Bronze Gun-Carriage Metal.

## 6-POUNDER GUN MOUNTS.

| Description. | Marks. | Diameter. | Sectional area. | Tensile strength per square inch. | Elongation in 2 inches. | Contraction of area. | Fracture. |
|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Per cent.* | *Per cent.* | |
| Pivot yoke | A 12 P Y 6 | .798 | .50 | 44,840 | 44.0 | 35.6 | Uniform golden-yellow color. |
| Do | A 13 P Y 6 | .798 | .50 | 50,960 | 44.0 | 33.6 | Do. |
| Do | A 14 P Y 6 | .798 | .50 | 47,160 | 40.0 | 31.6 | Do. |
| Do | A 15 P Y 6 | .798 | .50 | 39,600 | 21.5 | 20.8 | Light lavender color, with yellow metal at circumference. |
| Do | A 16 P Y 6 | .798 | .50 | 42,060 | 25.0 | 23.0 | Uniform golden yellow. |
| Do | A 17 P Y 6 | .798 | .50 | 39,860 | 21.0 | 23.0 | Light yellow, with zone of lavender-colored metal. |
| Do | A 18 P Y 6 | .798 | .50 | 45,600 | 40.5 | 31.6 | Uniform light golden yellow. |
| Do | A 19 P Y 6 | .798 | .50 | 41,420 | 16.5 | 9.2 | Dark brown and lavender color. |
| Do | A 20 P Y 6 | .798 | .50 | 42,460 | 24.0 | 16.4 | Light yellow, with lavender-colored tinge on one side. |
| Do | A 22 P Y 6 | .798 | .50 | 23,600 | 10.0 | 14.0 | Dark-yellow and golden-yellow metal intermingled. |
| Do | A 24 P Y 6 | .798 | .50 | 42,360 | 49.5 | 33.6 | Uniform light yellow. |
| Do | A 25 P Y 6 | .798 | .50 | 42,780 | 49.5 | 35.6 | Do. |
| Do | A 26 P Y 6 | .798 | .50 | 39,340 | 47.0 | 33.6 | Do. |
| Do | A 27 P Y 6 | .798 | .50 | 40,760 | 49.0 | 33.6 | Do. |
| Do | A 28 P Y 6 | .798 | .50 | 31,560 | 25.0 | 23.0 | Golden yellow, with dark-colored metal at circumference. |
| Do | A 29 P Y 6 | .798 | .50 | 37,340 | 32.5 | 33.6 | Do. |
| Do | A 30 P Y 6 | .798 | .50 | 40,020 | 48.0 | 33.6 | Uniform light yellow. |
| Do | A 31 P Y 6 | .798 | .50 | 43,720 | 49.5 | 41.6 | Do. |
| Do | A 32 P Y 6 | .798 | .50 | 21,600 | 3.5 | 2.0 | Lavender-colored, brown, and yellow metal intermingled. |

## Bronze Gun-Carriage Metal—Continued.

6-POUNDER GUN MOUNTS—Continued.

| Description. | Marks. | Diameter. | Sectional area. | Tensile strength per square inch. | Elongation in 2 inches. | Contraction of area. | Fracture. |
|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Per cent.* | *Per cent.* | |
| Pivot yoke | A 23 P Y 6 | .798 | .50 | 43,200 | 45.5 | 33.6 | Uniform light yellow. |
| Do | A 34 P Y 6 | .798 | .50 | 44,060 | 50.5 | 39.6 | Do. |
| Do | A 35 P Y 6 | .798 | .50 | 36,220 | 42.5 | 33.6 | Do. |
| Do | A 36 P Y 6 | .798 | .50 | 39,480 | 48.5 | 35.6 | Do. |
| Do | A 37 P Y 6 | .798 | .50 | 36,240 | 49.5 | 33.6 | Do. |
| Do | A 38 P Y 6 | .798 | .50 | 42,300 | 55.0 | 41.6 | Do. |
| Do | A 39 P Y 6 | .798 | .50 | 42,040 | 49.5 | 35.6 | Do. |
| Do | A 40 P Y 6 | .798 | .50 | 37,800 | 42.5 | 35.6 | Do. |
| Do | A 41 P Y 6 | .798 | .50 | 27,960 | 28.5 | 18.6 | Brown and light yellow, spongy. |
| Do | A 42 P Y 6 | .798 | .50 | 27,400 | 25.5 | 23.0 | Light and dark yellow. |
| Do | A 44 P Y 6 | .798 | .50 | 39,600 | 42.5 | 27.4 | Dark-yellow and brown metal intermingled. |
| Do | A 45 P Y 6 | .798 | .50 | 24,560 | 22.0 | 20.8 | Light yellow, with streaks of golden yellow. |
| Do | A 46 P Y 6 | .798 | .50 | 31,580 | 30.0 | 23.0 | Light and dark yellow and brown-colored metal. |
| Do | A 49 P Y 6 | .798 | .50 | 26,760 | 25.0 | 23.0 | Light and dark yellow, with streaks of golden yellow. |
| Do | A 57 P Y 6 | .798 | .50 | 36,200 | 49.0 | 33.6 | Uniform light yellow. |
| Do | A 58 P Y 6 | .798 | .50 | 26,960 | 24.0 | 23.0 | Light yellow, with streaks of light-brown metal. |
| Do | A 60 P Y 6 | .798 | .50 | 34,200 | 39.0 | 33.6 | Light and dark yellow metal intermingled. |
| Do | A 63 P Y 6 | .798 | .50 | 31,180 | 28.0 | 29.4 | Light and dark yellow, with streaks of golden yellow. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Do | A 64 P Y 6 | .798 | .50 | 32,800 | 37.5 | 31.6 | Do. |
| Do | A 47 P Y 6 | .798 | .50 | 36,380 | 40.0 | 31.6 | Light and dark yellow. |
| Do | A 50 P Y 6 | .798 | .50 | 27,200 | 21.5 | 20.8 | Light and dark yellow, with streaks of golden yellow. |
| Do | A 56 P Y 6 | .798 | .50 | 36,800 | 45.0 | 35.6 | Light and dark yellow. |
| Do | A 43 P Y 6 | .798 | .50 | 37,560 | 44.0 | 41.6 | Light and dark yellow metal intermingled. |
| Do | A 48 P Y 6 | .798 | .50 | 28,980 | 25.5 | 23.0 | Dark yellow, with streaks of golden yellow. |
| Do | A 51 P Y 6 | .798 | .50 | 26,400 | 29.5 | 25.2 | Light and dark yellow, 60 per cent; brown color, 40 per cent. |
| Do | A 53 P Y 6 | .798 | .50 | 24,760 | 27.0 | 18.6 | Brown and dark yellow. |
| Do | A 54 P Y 6 | .798 | .50 | 35,980 | 41.0 | 38.6 | Light and dark yellow metal intermingled. |
| Do | A 55 P Y 6 | .798 | .50 | 28,400 | 29.0 | 20.8 | Dark and light yellow, brown spot at circumference. |
| Do | A 59 P Y 6 | .798 | .50 | 37,240 | 55.5 | 39.6 | Uniform light yellow. |
| Do | A 61 P Y 6 | .798 | .50 | 34,600 | 42.0 | 35.6 | Do. |
| Do | A 62 P Y 6 | .798 | .50 | 28,560 | 31.5 | 29.4 | Light and dark yellow, seam near circumference. |
| Do | A 53 P Y 6 | .798 | .50 | 22,400 | 16.5 | 11.6 | Copper color and light yellow, serrated surface. |
| Do | A 52 P Y 6 | .564 | .25 | 32,400 | 35.5 | 27.6 | Dark yellow, with streaks of dark-brown metal. |
| Do | A 65 P Y 6 | .798 | .50 | 37,040 | 52.0 | 39.6 | Uniform light yellow. |
| Do | A 66 P Y 6 | .798 | .50 | 30,800 | 33.5 | 31.6 | Light yellow, with dark-brown center. |
| Recoil sleeve | A 14 R S 6 | .564 | .25 | 44,880 | 27.7 | 21.6 | Light lavender color. |
| Do | A 15 R S 6 | .564 | .25 | 39,640 | 18.7 | 21.6 | Yellow, with band of lavender-colored metal. |
| Do | A 16 R S 6 | .798 | .50 | 30,960 | 5.5 | 9.2 | Light yellow, with zone of lavender-colored metal. |
| Do | A 17 R S 6 | .798 | .50 | 31,880 | 5.5 | 9.2 | Brownish lavender colored. |
| Do | A 18 R S 6 | .798 | .50 | 28,720 | 3.5 | 4.4 | Do. |
| Do | A 19 R S 6 | .564 | .25 | 32,440 | 5.0 | 11.6 | Do. |
| Do | A 20 R S 6 | .798 | .50 | 29,360 | 3.5 | 4.4 | Do. |
| Do | A 22 R S 6 | .798 | .50 | 38,200 | 6.5 | 9.2 | Uniform light yellow. |
| Do | A 21 R S 6 | .798 | .50 | 31,600 | 5.5 | 9.2 | Brownish yellow, with lavender streak across middle. |

## BRONZE GUN-CARRIAGE METAL—Continued.

### 6-POUNDER GUN MOUNTS—Continued.

| Description. | Marks. | Diameter. | Sectional area. | Tensile strength per square inch. | Elongation in 2 inches. | Contraction of area. | Fracture. |
|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Per cent.* | *Per cent.* | |
| Recoil sleeve | A 26 R S 6 | .798 | .50 | 22,200 | 6.0 | 9.2 | Golden yellow. |
| Do | A 31 R S 6 | .798 | .50 | 20,400 | 6.5 | 4.4 | Variegated dark copper and light yellow colored metal. |
| Do | A 34 R S 6 | .798 | .50 | 19,960 | 3.5 | 4.4 | Copper-colored and light-yellow metal intermingled. |
| Do | A 37 R S 6 | .798 | .50 | 15,700 | 4.5 | 6.8 | Variegated dark copper and light yellow colored metal. |
| Do | A 23 R S 6 | .798 | .50 | 12,900 | 3.5 | 4.4 | Dark copper colored, spongy. |
| Do | A 24 R S 6 | .798 | .50 | 16,820 | 3.0 | 4.4 | Variegated dark yellow and copper colored, spongy. |
| Do | A 38 R S 6 | .798 | .50 | 31,400 | 24.0 | 23.0 | Light yellow, with darker yellow metal at one side. |
| Do | A 39 R S 6 | .798 | .50 | 29,200 | 19.5 | 23.0 | Light yellow, 80 per cent; dark brown, spongy, 20 per cent. |
| Do | A 40 R S 6 | .798 | .50 | 30,600 | 23.0 | 23.0 | Uniform light yellow. Vesicular surface. |
| Do | A 41 R S 6 | .798 | .50 | 32,640 | 24.5 | 23.0 | Light yellow, dark-yellow metal on one side. |
| Do | A 42 R S 6 | .798 | .50 | 27,200 | 16.0 | 20.8 | Light yellow, dark-brown spot at circumference. |
| Do | A 43 R S 6 | .798 | .50 | 31,960 | 25.0 | 23.0 | Light yellow, dark-brown spot at circumference. Vesicular surface. |
| Do | A 44 R S 6 | .798 | .40 | 32,800 | 31.0 | 29.4 | Uniform light yellow. |
| Do | A 53 R S 6 | .798 | .50 | 26,600 | 16.5 | 16.4 | Light yellow, dark brown, and copper-colored metal intermingled. |
| Do | A 45 R S 6 | .798 | .50 | 29,600 | 18.5 | 18.6 | Light yellow and golden-yellow metal intermingled. |
| Do | A 46 R S 6 | .798 | .50 | 29,040 | 22.5 | 20.8 | Light yellow, with spots of dark-brown metal. |
| Do | A 47 R S 6 | .798 | .50 | 28,760 | 22.0 | 20.8 | Light yellow, tinged with darker yellow metal. |
| Do | A 49 R S 6 | .798 | .50 | 33,140 | 28.5 | 20.8 | Light yellow, with spots of dark-yellow metal. |
| Do | A 50 R S 6 | .798 | .50 | 23,800 | 14.5 | 14.0 | Light yellow, tinged with darker yellow metal. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Do | A 52 R S 6 | .798 | .50 | 28,800 | 22.0 | 20.8 | Light yellow and greenish-brown metal. |
| Do | A 53 R S 6 | .798 | .50 | 31,200 | 27.0 | 20.8 | Light yellow, with patches of dark yellow. |
| Do | A 55 R S 6 | .798 | .50 | 30,300 | 25.0 | 23.0 | Do. |
| Do | A 48 R S 6 | .798 | .50 | 31,660 | 25.5 | 23.0 | Light yellow, with spots of dark brown and dark-yellow metal. |
| Do | A 51 R S 6 | .798 | .50 | 34,600 | 27.0 | 23.0 | Yellow metal, with a dark-brown spot. |
| Do | A 54 R S 6 | .798 | .50 | 31,000 | 27.5 | 23.0 | Uniform light yellow. |
| Do | A 56 R S 6 | .798 | .50 | 24,200 | 15.0 | 18.6 | Patches of light yellow, dark yellow, and brown metal. |
| Do | A 57 R S 6 | .798 | .50 | 24,320 | 17.5 | 16.4 | Dark brown at center, light yellow at circumference. |
| Do | A 58 R S 6 | .798 | .50 | 22,500 | 18.0 | 14.0 | Dark brown, with yellow metal in part. Vesicular surface. |
| Do | A 59 R S 6 | .798 | .50 | 26,040 | 18.0 | 16.4 | Light and dark yellow intermingled. |
| Do | A 60 R S 6 | .798 | .50 | 27,440 | 17.0 | 16.4 | Yellow, dark brown, and greenish metal in patches. |
| Do | A 61 R S 6 | .798 | .50 | 26,800 | 17.0 | 20.8 | Light yellow and dark yellow. |
| Do | A 62 R S 6 | .798 | .50 | 27,340 | 19.0 | 16.4 | Varying shades of yellow and brown. |
| Do | A 63 R S 6 | .798 | .50 | 25,340 | 17.0 | 16.4 | Light yellow, with patches of dark-yellow metal. |
| Do | A 64 R S 6 | .798 | .50 | 30,720 | 24.0 | 23.0 | Light yellow, with dark-brown spot at circumference. |
| Do | A 65 R S 6 | .798 | .50 | 27,760 | 17.0 | 14.0 | Light yellow, 60 per cent; dark brown, 40 per cent. |
| Do | A 66 R S 6 | .798 | .50 | 23,000 | 15.0 | 14.0 | Dark yellow and brown metal. |
| Do | A 67 R S 6 | .798 | .50 | 26,280 | 20.0 | 20.8 | Light yellow, golden yellow, and brown metal, in patches. |
| Do | A 68 R S 6 | .798 | .50 | 31,240 | 24.5 | 20.8 | Light yellow and golden-yellow metal. |
| Do | A 69 R S 6 | .798 | .50 | 27,100 | 20.0 | 16.4 | Do. |
| Do | A 50 2 R S 6 | .798 | .50 | 25,000 | 17.5 | 11.6 | Light and dark yellow, with patches of golden-yellow. |
| Do | A 56 2 R S 6 | .798 | .50 | 22,980 | 13.5 | 11.6 | Light and golden yellow, with patches of brown. |
| Do | A 57 2 R S 6 | .798 | .50 | 29,400 | 24.0 | 18.6 | Light and golden yellow metal. |
| Do | A 58 2 R S 6 | .798 | .50 | 22,380 | 13.0 | 11.6 | Light and dark yellow. |
| Do | A 66 2 R S 6 | .798 | .50 | 20,400 | 13.0 | 9.2 | Light and dark yellow and brown color. |
| Do | A 70 R S 6 | .798 | .50 | 20,000 | 12.0 | 14.0 | Light and dark yellow, with patch of brown-colored metal. |

## BRONZE GUN-CARRIAGE METAL—Continued.

6-POUNDER GUN MOUNTS—Continued.

| Description. | Marks. | Diameter. | Sectional area. | Tensile strength per square inch. | Elongation in 2 inches. | Contraction of area. | Fracture. |
|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Per cent.* | *Per cent.* | |
| Recoil sleeve | A 72 R S 6 | .798 | .50 | 18,800 | 10.5 | 9.2 | Light and dark yellow. Vesicular surface. |
| Do | A 74 R S 6 | .798 | .50 | 21,180 | 13.5 | 11.6 | Light and dark yellow, with patch of brown-colored metal. |
| Do | A 71 R S 6 | .798 | .50 | 28,000 | 22.0 | 23.0 | Light and dark yellow. |
| Do | A 73 R S 6 | .798 | .50 | 30,160 | 24.0 | 23.0 | Do. |
| Do | A 77 R S 6 | .798 | .50 | 26,840 | 19.5 | 20.8 | Do. |
| Do | A 75 R S 6 | .798 | .50 | 22,200 | 13.5 | 16.4 | Golden yellow; small patches of lavender-colored metal. |
| Do | A 78 R S 6 | .798 | .50 | 19,560 | 13.5 | 11.6 | Light and dark yellow. Vesicular surface. |
| Do | A 79 R S 6 | .798 | .50 | 17,000 | 6.5 | 9.2 | Golden yellow; patches of light yellow. Vesicular surface. |
| Do | A 80 R S 6 | .798 | .50 | 18,200 | 8.5 | 6.8 | Golden yellow. Vesicular surface. |
| Do | A 81 R S 6 | .798 | .50 | 16,960 | 1.5 | 4.4 | Do. |
| Do | A 79 2 R S 6 | .798 | .50 | 19,880 | 10.0 | 9.2 | Dark brown; yellow streaks. Vesicular surface, |
| Do | A 80 2 R S 6 | .798 | .50 | 16,640 | 5.5 | 6.8 | Copper color and light yellow. Vesicular surface. |
| Do | A 76 R S 6 | .798 | .50 | 28,780 | 22.5 | 20.8 | Golden yellow. Vesicular surface. |
| Oscillating slide | A 9 O S 6 | .564 | .25 | 42,000 | 27.0 | 24.4 | Yellow and lavender color. |
| Do | A 11 O S 6 | .798 | .50 | 44,360 | 22.5 | 20.8 | Light yellow, with zone of lavender-colored metal. |
| Do | A 10 O S 6 | .798 | .50 | 52,680 | 59.0 | 43.4 | Uniform light yellow. |
| Do | A 13 O S 6 | .798 | .50 | 47,600 | 46.0 | 37.6 | Do. |
| Do | A 12 O S 6 | .798 | .50 | 49,020 | 52.0 | 39.6 | Do. |
| Do | A 14 O S 6 | .798 | .50 | 12,600 | 4.0 | 2.0 | Light yellow; spongy. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Do | A 15 O S 6 | .798 | .50 | 12,120 | 8.0 | 2.0 | Dark brown; spongy. |
| Do | A 16 O S 6 | .798 | .50 | 29,940 | 15.5 | 14.0 | Light yellow and lavender intermingled. |
| Do | A 17 O S 6 | .798 | .50 | 27,200 | 13.0 | 11.6 | Light yellow, lavender, and golden yellow intermingled. |
| Do | A 18 O S 6 | .798 | .50 | 37,040 | 31.5 | 27.4 | Uniform light yellow. |
| Do | A 19 O S 6 | .798 | .50 | 28,560 | 22.0 | 16.4 | Dark yellow and brown-colored metal intermingled. |
| Do | A 20 O S 6 | .798 | .50 | 29,380 | 23.5 | 20.8 | Dark brown, dark yellow, and golden yellow. |
| Do | A 21 O S 6 | .798 | .50 | 32,600 | 28.5 | 23.0 | Golden yellow, with darker yellow spots. |
| Do | A 22 O S 6 | .798 | .50 | 25,920 | 18.0 | 14.0 | Lavender color, interspersed with dark-brown spots. |
| Do | A 23 O S 6 | .798 | .50 | 21,820 | 12.5 | 14.0 | Different shades of light and golden yellow. |
| Do | A 24 O S 6 | .798 | .50 | 28,200 | 13.0 | 14.0 | Light yellow and lavender-colored metal intermingled. |
| Do | A 25 O S 6 | .798 | .50 | 32,440 | 24.0 | 23.0 | Light yellow; darker metal on one side. |
| Do | A 26 O S 6 | .798 | .50 | 31,620 | 27.0 | 23.0 | Golden yellow; dark spot at circumference. |
| Do | A 27 O S 6 | .798 | .50 | 29,940 | 26.0 | 23.0 | Light yellow; with dark-brown center. |
| Do | A 28 O S 6 | .798 | .50 | 27,440 | 21.0 | 18.6 | Yellow, with irregular streaks of dark-brown metal. |
| Do | A 29 O S 6 | .798 | .50 | 26,420 | 16.5 | 18.6 | Light brown and dark-blue metal intermingled; spongy. |
| Do | A 30 O S 6, | .798 | .50 | 31,200 | 26.0 | 23.0 | Light yellow, with darker metal on one side. |
| Do | A 31 O S 6 | .798 | .50 | 29,240 | 25.0 | 20.8 | Light and dark yellow metal intermingled. |
| Do | A 32 O S 6 | .798 | .50 | 31,960 | 24.0 | 18.6 | Variegated dark yellow and copper-colored metal. |
| Do | A 33 O S 6 | .798 | .50 | 26,640 | 15.0 | 14.0 | Variegated copper and lavender-colored metal. |
| Do | A 34 O S 6 | .798 | .50 | 28,800 | 19.0 | 18.6 | Dark yellow and copper-colored metal intermingled. |
| Do | A 35 O S 6 | .798 | .50 | 30,400 | 23.0 | 20.8 | Dark yellow and light yellow metal intermingled. |
| Do | A 36 O S 6 | .798 | .50 | 29,800 | 24.0 | 18.6 | Do. |
| Do | A 37 O S 6 | .798 | .50 | 28,560 | 21.5 | 16.4 | Brown and light-yellow metal intermingled. |
| Do | A 38 O S 6 | .798 | .50 | 25,580 | 21.0 | 18.6 | Light yellow, with streaks of darker-colored metal. **Laminated.** |
| Do | A 22 2 O S 6 | .798 | .50 | 18,040 | 11.5 | 6.8 | Dark brown and copper-colored metal intermingled. |
| Do | A 23 2 O S 6 | .798 | .50 | 20,100 | 13.0 | 9.2 | Dark brown. |

## Bronze Gun-Carriage Metal—Continued.

6-POUNDER GUN MOUNTS—Continued.

| Description. | Marks. | Diameter. | Sectional area. | Tensile strength per square inch. | Elongation in 2 inches. | Contraction of area. | Fracture. |
|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Per cent.* | *Per cent.* | |
| Oscillating slide | A 39 O S 6 | .798 | .50 | 31,940 | 32.5 | 29.4 | Light yellow |
| Do | A 40 O S 6 | .798 | .50 | 28,820 | 25.0 | 20.8 | Light yellow, dark brown, and copper-colored metal intermingled. |
| Do | A 41 O S 6 | .798 | .50 | 29,000 | 21.5 | 18.6 | Uniform light golden yellow color. |
| Do | A 42 O S 6 | .798 | .50 | 29,540 | 25.0 | 18.6 | Light and golden yellow metal intermingled. |
| Do | A 43 O S 6 | .798 | .50 | 28,060 | 21.0 | 23.0 | Light yellow, with spot of darker yellow at circumference. |
| Do | A 44 O S 6 | .798 | .50 | 30,620 | 26.5 | 20.8 | Light and dark yellow metal intermingled. |
| Do | A 45 O S 6 | .798 | .50 | 27,040 | 25.0 | 20.8 | Light yellow, with streaks of dark yellow metal. |
| Do | A 46 O S 6 | .798 | .50 | 33,000 | 29.5 | 23.0 | Uniform light yellow. |
| Do | A 47 O S 6 | .798 | .50 | 59,000 | 40.0 | 37.6 | Uniform light yellow, silvery luster. |
| Do | A 57 O S 6 | .798 | .50 | 21,580 | 14.0 | 14.0 | Dark yellow and dark-brown color. |
| Do | A 58 O S 6 | .798 | .50 | 19,980 | 13.5 | 14.0 | Dark yellow and light-brown spongy metal. |
| Do | A 59 O S 6 | .798 | .50 | 22,360 | 15.0 | 16.4 | Light brown, with patches of dark yellow. |
| Do | A 60 O S 6 | .798 | .50 | 27,180 | 21.5 | 18.6 | Dark yellow and golden yellow. |
| Do | A 52 1 O S 6 | .798 | .50 | 49,980 | 53.5 | 37.6 | Uniform light yellow. |
| Do | A 52 2 O S 6 | .798 | .50 | 22,800 | 8.5 | 9.2 | Dark yellow and lavender, dark brown at circumference. |
| Do | A 61 O S 6 | .798 | .50 | 57,960 | 25.0 | 25.2 | Uniform dark-brownish green. |
| Do | A 62 O S 6 | .798 | .50 | 63,800 | 46 5 | 43.4 | Uniform light-brownish green. |
| Do | A 63 O S 6 | .798 | .50 | 66,040 | 37.5 | 35.6 | Do. |
| Do | A 64 O S 6 | .798 | .50 | 25,000 | 17.5 | 18.6 | Light yellow; streaks of golden yellow. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Do. | A 65 O S 6 | .798 | .50 | 26,380 | 19.0 | 16.4 | Do. |
| Do. | A 66 O S 6 | .798 | .50 | 24,000 | 19.0 | 16.4 | Light yellow and golden yellow. |
| Do. | A 67 O S 6 | .798 | .50 | 20,400 | 13.5 | 11.6 | Dark brown; patches of light yellow. |
| Do. | A 68 O S 6 | .798 | .50 | 27,580 | 26.0 | 23.0 | Light and dark yellow. |
| Do. | A 58 2 O S 6 | 798 | .50 | 23,920 | 20.0 | 16.4 | Variegated dark-brown and yellow color. |
| Do. | A 59 2 O S 6 | 798 | .50 | 23,600 | 17 0 | 14.0 | Do. |
| Do. | A 67 2 O S 6 | .798 | .50 | 21,440 | 15.5 | 14.0 | Yellow metal, with dark-brown flaky sections. |
| Guide sleeve | 1 | .798 | .50 | 41,400 | 14.5 | 16.4 | Yellow and lavender-colored metal interspersed. |
| Do | 2 | .798 | .50 | 18,800 | 4.5 | 9.2 | Yellow and lavender-colored metal interspersed. Dark spongy spot. |
| Recoil cylinder | R C 4 | .798 | .50 | 28,620 | 21.5 | 18.6 | at circumference. |
| Do | R C 5 | .798 | .50 | 30,440 | 22.5 | 20.8 | |
| Do | R C 6 | .798 | .50 | 21,600 | 11.0 | 9.2 | on yellow metal. Opened cracks along sur |
| Do | R C 7 | .798 | .50 | 26,820 | 21.0 | 18.6 | |
| Do | R C 8 | .798 | .50 | 25,240 | 19.5 | 18.6 | |
| Do | R C 9 | .798 | .50 | 23,920 | 15.0 | 11.6 | |
| Do | R C 10 | .798 | .50 | 27,500 | 21.0 | 18.6 | |
| Trail spade | T S 3 | .564 | .25 | 34,720 | 5.0 | 8.4 | intermingled. |
| Cradle | 1 | .798 | .50 | 25,580 | 6.5 | 9.2 | etal. |

15-POUNDER GUN MOUNTS.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Pivot yoke | A 9 P Y 15 | .798 | .50 | 42,460 | 26.5 | 27.4 | Uniform golden-yellow color. |
| Do | A 10 P Y 15 | .798 | .50 | 46,720 | 35.0 | 31.6 | Do. |
| Do | A 11 P Y 15 | .798 | .50 | 40,020 | 25.0 | 27.4 | Do. |
| Do | A 12 P Y 15 | .798 | .50 | 29,820 | 11.5 | 23.0 | Do. |
| Do | A 13 P Y 15 | .798 | .50 | 48,640 | 31.0 | Fractured in neck. | Do. |
| Do | A 14 P Y 15 | .798 | .50 | 48,920 | 36.5 | 25.2 | Light yellow, with lavender-colored metal interspersed. |
| Do | A 15 P Y 15 | .564 | .25 | 47,880 | 52.0 | 42.0 | Uniform light yellow. |
| Do | A 16 P Y 15 | .798 | 50 | 52,160 | 62.0 | 47.2 | Do. |
| Recoil sleeve | A 8 R S 15 | .564 | .25 | 43,880 | 31.7 | 24.4 | Uniform golden-yellow color |

## Bronze Gun-Carriage Metal—Continued.

15-POUNDER GUN MOUNTS—Continued.

| Diameter. | Sectional area. | Tensile strength per square inch. | Elongation in 2 inches. | Contraction of area. | Fracture. |
|---|---|---|---|---|---|
| *Inch.* | *Sq. inch.* | *Pounds.* | *Per cent.* | *Per cent* | |
| .564 | .25 | 37,280 | 15.0 | 18.4 | Lavender and yellow-colored metal intermingled. |
| .796 | .50 | 31,420 | 6.5 | 6.8 | Dark-brown color |
| .796 | .50 | 42,060 | 28.5 | 28.0 | Dark yellow; streak of lavender-colored metal. |
| .564 | .25 | 34,240 | 8.0 | 15.2 | Brownish lavender color |
| .798 | .50 | 31,200 | 5.0 | 6.8 | Dark-brown color. |
| .798 | .50 | 34,420 | 6.5 | 6.8 | Brownish lavender color. |
| .796 | .50 | 34,240 | 5.0 | 6.8 | Do. |
| .796 | .50 | 31,840 | 4.0 | 4.4 | Do. |
| .796 | .50 | 31,240 | 5.0 | 9.2 | Do. |
| .796 | .50 | 39,200 | 14.5 | 16.4 | Light-yellow color |
| .796 | .50 | 26,040 | 6.0 | 9.2 | Brownish lavender color. |
| 798 | .50 | 33,020 | 5.0 | 9.2 | Light-lavender color. |
| .798 | .50 | 33,840 | 5.5 | 6.8 | Light-yellow, with streak of lavender-colored metal. |
| .796 | .50 | 37,600 | 8.5 | 11.6 | Uniform light yellow |
| .796 | .50 | 31,220 | 14.0 | 16.4 | Lavender color |
| .796 | .50 | 28,980 | 15.0 | 11.6 | Light yellow, with strata of dark brown metal. |
| .798 | .50 | 25,200 | 18.0 | 16.4 | Brown and dark-yellow metal. |
| .798 | .50 | 33,960 | 31.5 | 27.4 | Dark yellow, 60 per cent, light brown, 40 per cent. |
| .795 | .50 | 32,000 | 29.5 | 25.2 | Dark and light yellow metal |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Do | A 24 R S 15 | .798 | .50 | 22,800 | 15.0 | 14.0 | Light-yellow and brown metal intermingled. |
| Do | A 28 R S 15 | .798 | .50 | 35,680 | 30.0 | 23.0 | Uniform light yellow. |
| Do | A 29 R S 15 | .798 | .50 | 33,040 | 27.5 | 20.8 | Do. |
| Do | A 25 2 R S 15 | .798 | .50 | 21,180 | 12.5 | 14.0 | Dark-brown and light-yellow metal intermingled. |
| Do | A 34 R S 15 | .798 | .50 | 45,960 | 50.0 | 37.6 | Uniform light yellow. |
| Do | A 35 R S 15 | .798 | .50 | 43,600 | 40.0 | 33.6 | Do. |
| Do | A 24 2 R S 15 | .564 | .25 | 25,040 | 21.0 | 18.4 | Golden and light yellow; brown color at circumference. |
| Do | A 36 R S 15 | .798 | .50 | 29,200 | 23.0 | 20.8 | Light and dark yellow. Vesicular surface. |
| Do | A 38 R S 15 | .798 | .50 | 28,560 | 22.0 | 18.6 | Light and dark yellow with patch of golden yellow. |
| Do | A 39 R S 15 | .798 | .50 | 26,940 | 18.0 | 18.6 | Light and dark yellow. Vesicular surface. |
| Do | A 40 R S 15 | .798 | .50 | 29,180 | 26.0 | 20.8 | Do. |
| Do | A 47 R S 15 | .798 | .50 | 24,980 | 15.5 | 18.6 | Do. |
| Do | A 50 R S 15 | .798 | .50 | 25,600 | 16.0 | 18.6 | Light and golden yellow. Vesicular surface. |
| Do | A 41 R S 15 | .798 | .50 | 26,200 | 21.5 | 16.4 | Light and dark yellow; dark spot at circumference. |
| Do | A 42 R S 15 | .798 | .50 | 25,200 | 18.5 | 14.0 | Light and dark yellow; golden yellow at circumference. |
| Do | A 43 R S 15 | .798 | .50 | 29,560 | 24.5 | 23.0 | Light and dark yellow. |
| Do | A 44 R S 15 | .798 | .50 | 30,400 | 26.5 | 20.8 | Light and dark yellow. Vesicular surface. |
| Do | A 45 R S 15 | .798 | .50 | 32,780 | 26.5 | 25.2 | Light and dark yellow. |
| Do | A 48 R S 15 | .798 | .50 | 24,160 | 14.0 | 14.0 | Light and dark yellow. Vesicular surface. |
| Do | A 49 R S 15 | .798 | .50 | 31,780 | 28.0 | 25.2 | Do. |
| Do | A 37 R S 15 | .798 | .50 | 32,200 | 29.0 | 27.4 | Light yellow, 40 per cent; dark yellow, 60 per cent. |
| Do | A 53 R S 15 | .798 | .50 | 34,360 | 30.5 | 27.4 | Light and dark yellow. |
| Do | A 51 R S 15 | .798 | .50 | 65,780 | 32.0 | 29.4 | Uniform brownish green. |
| Do | A 54 R S 15 | .798 | .50 | 55,400 | 25.0 | 27.4 | Brownish green; dark spot at circumference. |
| Do | A 57 R S 15 | .798 | .50 | 41,240 | 11.5 | 16.4 | Dark brownish green; dark spot at circumference. |
| Do | A 58 R S 15 | .798 | .50 | 61,600 | 32.0 | 33.6 | Uniform brownish green. |

## Bronze Gun-Carriage Metal—Continued.

### 16-POUNDER GUN MOUNTS—Continued.

| Description. | Marks | | ectional area. | Tensile strength per square inch. | Elongation in 2 inches. | | |
|---|---|---|---|---|---|---|---|
| | | | *q. inch.* | *Pounds.* | *Per cent.* | *Per cent* | |
| Recoil sleeve | A 60 R S 15 | .798 | .50 | 50,320 | 16.5 | 20.8 | Lavender and lemon color. |
| Do | A 62 R S 15 | .798 | .50 | 26,640 | 1.5 | ..... | Broke in head Dark brown, spongy. Spongy along the stem. |
| Do | A 63 R S 15 | .798 | .50 | 29,480 | 2.5 | ..... | Do. |
| Do | A 64 R S 15 | .798 | .50 | 56,200 | 20.5 | 25.2 | Light lemon-yellow color. |
| Do | A 65 R S 15 | .798 | .50 | 64,500 | 32.0 | 29.4 | Do. |
| Do | A 66 R S 15 | .798 | .50 | 23,600 | 1.0 | ..... | Broke in the neck. Dark greenish brown, spongy. |
| Do | A 68 R S 15 | .798 | .50 | 54,400 | 22.0 | 23.0 | Light-yellow and lavender color. |
| Do | A 67 R S 15 | .564 | .25 | 48,480 | 9.5 | 15.2 | Light lemon yellow; dark-brown spot at circumference. |
| Do | A 59 R S 15 | .798 | .50 | 53,600 | 20.0 | 23.0 | Uniform brownish green. |
| Do | A 62 2 R S 15 | .564 | .25 | 35,120 | 9.5 | 11.6 | Lemon yellow and lavender. |
| Do | A 63 2 R S 15 | .564 | .25 | 31,960 | 3.5 | ..... | Broke in the neck. Greenish brown and dark yellow. |
| Do | A 66 2 R S 15 | .798 | .50 | 54,400 | 28.0 | 31.6 | Uniform light brownish green. |
| Do | A 61 R S 15 | .798 | .50 | 59,600 | 32.5 | 25.2 | Uniform light lemon yellow. |
| Oscillating slide | A 4 O S 15 | .798 | .50 | 36,440 | 13.5 | 11.6 | Brownish yellow and lavender color. |
| Do | A 7 O S 15 | .798 | .50 | 39,240 | 16.5 | 18.6 | Do. |
| Do | A 8 O S 15 | .798 | .50 | 40,040 | 11.5 | 11.6 | Lavender color, with zone of yellow-colored metal. |
| Do | A 9 O S 15 | .798 | .50 | 50,400 | 43.0 | 35.6 | Uniform light yellow. |
| Do | A 11 O S 15 | .798 | .50 | 48,200 | 50.5 | 39.6 | Do. |
| Do | A 12 O S 15 | .798 | .50 | 32,060 | 23.5 | 23.0 | Light yellow, with patches of dark yellow. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Do | A 15 O S 15 | .798 | .50 | 36,760 | 41.5 | 33.6 | Do. |
| Do | A 16 O S 15 | .798 | .50 | 35.000 | 30.5 | 25.2 | Light yellow, dark-yellow metal on one side. |
| Do | A 13 O S 15 | .798 | .50 | 33,600 | 26.0 | 23.0 | Light yellow, golden-yellow and brown metal in patches. |
| Do | A 14 O S 15 | .798 | .50 | 28,560 | 24.0 | 20.8 | Brown and light yellow intermingled. |
| Do | A 24 O S 15 | .798 | .50 | 22,200 | 17.0 | 14.0 | Fractured along different oblique planes. Dark-brown vesicular surfaces. Opened cracks along stem. |
| Do | A 26 O S 15 | .798 | .50 | 30,580 | 27.0 | 18.6 | Light and dark yellow, and dark-brown metal. |
| Do | A 27 O S 15 | .798 | .50 | 27,760 | 18.5 | 16.4 | Light and dark yellow, with patches of brown-colored metal. |
| Do | A 28 O S 15 | .798 | .50 | 29,800 | 26.5 | 23.0 | Dark yellow, 80 per cent; light yellow, 20 per cent. |
| Do | A 29 O S 15 | .798 | .50 | 24,960 | 19.0 | 18.6 | Dark yellow and brown color. |
| Do | A 30 O S 15 | .798 | .50 | 33,400 | 31.5 | 31.6 | Light and dark yellow metal intermingled. |
| Do | A 31 O S 15 | .798 | .50 | 31,780 | 27.5 | 27.4 | Do. |
| Do | A 32 O S 15 | .798 | .50 | 28,000 | 28.0 | 20.8 | Golden yellow, with patches of dark yellow. |
| Do | A 24 2 O S 15 | .798 | .50 | 27,580 | 26.0 | 20.8 | Light yellow and golden yellow, with streaks of brown. |
| Do | A 34 O S 15 | .798 | .50 | 31,640 | 30.0 | 25.2 | Light and dark yellow and brown colored metal. |
| Do | A 23 1 O S 15 | .798 | .50 | 47,820 | 39.5 | 33.6 | Uniform light yellow. |
| Do | A 23 2 O S 15 | .798 | .50 | 23,960 | 8.0 | 6.8 | Light-yellow and lavender color. |
| Do | A 33 O S 15 | .798 | .50 | 29,580 | 30.0 | 25.2 | Light and dark yellow. |
| Do | A 35 O S 15 | .798 | .50 | 27,000 | 18.5 | 16.4 | Light yellow, streaks of dark yellow. |
| Do | A 36 O S 15 | .798 | .50 | 34,160 | 40.5 | 31.6 | Light and dark yellow intermingled. |
| Do | A 40 O S 15 | .798 | .50 | 33,040 | 32.5 | 27.4 | Do. |
| Do | A 37 O S 15 | .798 | .50 | 29,780 | 31.0 | 27.4 | Light and dark yellow. Seam from circumference to center. |
| Do | A 39 O S 15 | .798 | .50 | 21,240 | 16.5 | 16.4 | Light yellow, streaks of brown, and golden yellow. |
| Do | A 43 O S 15 | .798 | .50 | 25,560 | 21.0 | 20.8 | Light and dark yellow, patches of brown, |
| Do | A 44 O S 15 | .798 | .50 | 27,680 | 22.0 | 18.6 | Dark yellow and lavender intermingled. |
| Do | A 45 O S 15 | .798 | .50 | 29,800 | 25.0 | 25.2 | Light yellow, patches of golden yellow |
| Do | A 47 O S 15 | .798 | .50 | 56,780 | 26.5 | 27.4 | Uniform brownish green. |

## BRONZE GUN-CARRIAGE METAL.—Continued.

### 15-POUNDER GUN MOUNTS—Continued.

| Description. | Marks. | Diameter. | Sectional area. | Tensile strength per square inch. | Elongation in 2 inches. | Contraction of area. | Fracture. |
|---|---|---|---|---|---|---|---|
| | | *Inch.* | *Sq. inch.* | *Pounds.* | *Per cent.* | *Per cent.* | |
| Oscillating slide | A 38 O S 15 | .798 | .50 | 33,580 | 36.0 | 33.6 | Light and dark yellow. |
| Do | A 41 O S 15 | .798 | .50 | 27,440 | 26.5 | 27.4 | Light and dark yellow, streaks of brown. |
| Do | A 48 O S 15 | .798 | .50 | 57,980 | 28.0 | 27.4 | Light brownish green. |
| Do | A 49 O S 15 | .798 | .50 | 54,000 | 30.5 | 29.4 | Light yellow and light lavender. |
| Do | A 50 O S 15 | .798 | .50 | 55,960 | 31.5 | 31.6 | Light brownish green. |
| Do | A 51 O S 15 | .798 | .50 | 57,800 | 35.5 | 33.6 | Uniform light brownish green. |
| Do | A 39 2 O S 15 | .798 | .50 | 25,300 | 22.5 | 18.6 | Copper color and light yellow. Serrated surface. |
| Do | A 52 O S 15 | .798 | .50 | 50,720 | 49.5 | 41.6 | Uniform light lemon yellow. |
| Do | A 53 O S 15 | .798 | .50 | 27,800 | 25.5 | 20.8 | Light and dark yellow. |
| Do | A 54 O S 15 | .798 | .50 | 38,700 | 20.0 | 23.0 | Light lemon yellow, dark-colored spongy spot. |
| Do | A 55 O S 15 | .798 | .50 | 59,200 | 28.0 | 25.2 | Uniform light lemon color. |
| Do | A 57 O S 15 | .798 | .50 | 58,800 | 26.0 | 27.4 | Do. |
| Do | A 61 O S 15 | .798 | .50 | 58,800 | 35.5 | 29.4 | Do. |
| Do | A 43 2 O S 15 | .798 | .50 | 30,580 | 30.0 | 25.2 | Light yellow, streaks of golden yellow. |
| Do | A 56 O S 15 | .798 | .50 | 52,200 | 51.5 | 41.6 | Uniform light lemon yellow. |
| Do | A 58 O S 15 | .798 | .50 | 35,960 | 12.5 | 18.6 | Lavender, patches of lemon yellow. |
| Do | A 59 O S 15 | .798 | .50 | 32,600 | 9.5 | 9.2 | Lavender and lemon yellow. Large dark spot at the circumference. |
| Do | A 60 O S 15 | .798 | .50 | 39,180 | 12.0 | 14.0 | Lavender and lemon yellow. |
| Do | A 46 2 O S 15 | .798 | .50 | 26,440 | 21.0 | 16.4 | Brown and dark yellow. |

## Mean compression of 10 cylinders made in France.
## Table for use with pressure gauge one-tenth square inch area.

| Compression of cylinders that have been initially compressed under loads of— | | | Load per square inch on pressure gauge one-tenth square inch area. | Total compressions. | | | | | | | | | | | Sets. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | Mean. | |
| 24,000 | 28,000 | 32,000 | | | | | | | | | | | | | |
| *Inch.* | *Inch.* | *Inch.* | *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* |
| | | | 3,000 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| | | | 6,000 | .0001 | .0004 | .0008 | .0004 | .0004 | .0009 | .0003 | .0004 | .0009 | .0003 | .0004 | .0002 |
| | | | 9,000 | .0063 | .0030 | .0010 | .0012 | .0027 | .0114 | .0014 | .0008 | .0035 | .0009 | .0032 | .0027 |
| | | | 10,000 | .0095 | .0065 | .0020 | .0029 | .0062 | .0154 | .0036 | .0010 | .0065 | .0011 | .0055 | .0049 |
| | | | 11,000 | .0135 | .0095 | .0060 | .0069 | .0093 | .0196 | .0072 | .0011 | .0100 | .0015 | .0085 | .0079 |
| | | | 12,000 | .0175 | .0130 | .0094 | .0102 | .0130 | .0243 | .0105 | .0015 | .0136 | .0028 | .0115 | .0108 |
| | | | 13,000 | .0220 | .0170 | .0125 | .0138 | .0169 | .0295 | .0141 | .0030 | .0180 | .0058 | .0158 | .0145 |
| | | | 14,000 | .0263 | .0213 | .0165 | .0176 | .0211 | .0345 | .0172 | .0059 | .0220 | .0081 | .0190 | .0181 |
| | | | 15,000 | .0312 | .0260 | .0205 | .0219 | .0251 | .0392 | .0216 | .0085 | .0265 | .0115 | .0232 | .0222 |
| | | | 16,000 | .0359 | .0300 | .0245 | .0253 | .0296 | .0445 | .0258 | .0120 | .0312 | .0153 | .0274 | .0263 |
| | | | 17,000 | .0403 | .0340 | .0288 | .0300 | .0340 | .0487 | .0302 | .0151 | .0358 | .0187 | .0316 | .0305 |
| | | | 18,000 | .0450 | .0389 | .0329 | .0344 | .0386 | .0538 | .0345 | .0190 | .0400 | .0225 | .0359 | .0348 |
| | | | 19,000 | .0498 | .0430 | .0373 | .0382 | .0429 | .0584 | .0395 | .0221 | .0444 | .0266 | .0402 | .0391 |
| 0. | 0. | 0. | 20,000 | .0530 | .0469 | .0414 | .0426 | .0472 | .0621 | .0410 | .0266 | .0485 | .0306 | .0440 | .0429 |
| .0002 | .0001 | .0002 | 21,000 | .0580 | .0518 | .0455 | .0468 | .0515 | .0670 | .0471 | .0305 | .0524 | .0340 | .0485 | .0474 |
| .0005 | .0002 | .0003 | 22,000 | .0621 | .0550 | .0498 | .0510 | .0555 | .0705 | .0503 | .0335 | .0568 | .0384 | .0523 | .0512 |
| .0007 | .0003 | .0004 | 23,000 | .0664 | .0597 | .0537 | .0550 | .0597 | .0746 | .0550 | .0378 | .0612 | .0420 | .0565 | .0554 |
| .0010 | .0004 | .0005 | 24,000 | .0702 | .0640 | .0574 | .0589 | .0637 | .0784 | .0584 | .0417 | .0648 | .0460 | .0608 | .0591 |
| .0025 | .0005 | .0006 | 25,000 | .0744 | .0675 | .0614 | .0630 | .0677 | .0829 | .0618 | .0471 | .0690 | .0513 | .0646 | .0634 |
| .0060 | .0007 | .0007 | 26,000 | .0787 | .0720 | .0657 | .0664 | .0714 | .0860 | .0668 | .0490 | .0720 | .0530 | .0681 | .0669 |
| .0110 | .0009 | .0008 | 27,000 | .0818 | .0744 | .0691 | .0713 | .0754 | .0900 | .0698 | .0540 | .0769 | .0589 | .0722 | .0710 |
| .0152 | .0014 | .0009 | 28,000 | .0855 | .0784 | .0730 | .0738 | .0791 | .0924 | .0740 | .0564 | .0786 | .0615 | .0758 | .0741 |
| .0188 | .0053 | .0010 | 29,000 | .0894 | .0820 | .0767 | .0788 | .0830 | .0969 | .0768 | .0621 | .0839 | .0653 | .0795 | .0783 |
| .0230 | .0083 | .0012 | 30,000 | .0932 | .0860 | .0804 | .0813 | .0862 | .1005 | .0805 | .0640 | .0870 | .0681 | .0827 | .0814 |
| .0260 | .0117 | .0015 | 31,000 | .0959 | .0892 | .0826 | .0854 | .0903 | .1036 | .0843 | .0689 | .0915 | .0724 | .0864 | .0851 |
| .0295 | .0150 | .0018 | 32,000 | .0994 | .0930 | .0873 | .0884 | .0930 | .1070 | .0874 | .0710 | .0922 | .0755 | .0894 | .0881 |
| .0328 | .0184 | .0028 | 33,000 | .1030 | .0955 | .0905 | .0921 | .0969 | .1103 | .0894 | .0748 | .0977 | .0795 | .0929 | .0916 |
| .0354 | .0215 | .0080 | 34,000 | .1058 | .0989 | .0940 | .0955 | .1010 | .1135 | .0955 | .0789 | .1004 | .0824 | .0966 | .0953 |
| .0392 | .0245 | .0114 | 35,000 | .1100 | .1026 | .0970 | .0989 | .1031 | .1168 | .0970 | .0825 | .1045 | .0863 | .0999 | .0985 |
| .0429 | .0280 | .0148 | 36,000 | .1134 | .1059 | .1004 | .1025 | .1078 | .1195 | .1016 | .0834 | .1073 | .0898 | .1032 | .1018 |
| .0454 | .0314 | .0179 | 37,000 | .1160 | .1095 | .1089 | .1051 | .1098 | .1230 | .1035 | .0899 | .1111 | .0929 | .1065 | .1051 |
| .0489 | .0345 | .0216 | 38,000 | .1208 | .1124 | .1068 | .1085 | .1144 | .1260 | .1080 | .0917 | .1131 | .0963 | .1098 | .1084 |

| *Inch.* | *Inch.* | *Inch.* | | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| .4333 | .4104 | .4190 | Lengths | .4490 | .4992 | .4962 | .4989 | .5000 | .4992 | .4995 | .4991 | .4997 | .4994 | .4992 | |
| | | | Diameters | .2522 | .2522 | .2524 | .2521 | .2518 | .2522 | .2522 | .2522 | .2543 | .2524 | .2524 | |

| Compression of cylinders that have been initially compressed under loads of— | | | Load per square inch on pressure gauge one-tenth square inch area. | Total compressions. | | | | | | | | | | | Sets. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24,000 | 28,000 | 32,000 | | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | Mean. | |
| *Inch.* | *Inch.* | *Inch.* | *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* |
| .0520 | .0374 | .0239 | 39,000 | .1215 | .1154 | .1105 | .1126 | .1166 | .1295 | .1102 | .0965 | .1178 | .0981 | .1129 | .1115 |
| .0553 | .0409 | .0283 | 40,000 | .1243 | .1189 | .1129 | .1155 | .1204 | .1319 | .1145 | .0985 | .1193 | .1029 | .1159 | .1145 |
| ..... | ..... | ..... | 41,000 | .1275 | .1214 | .1170 | .1188 | .1282 | .1360 | .1166 | .1025 | .1240 | .1054 | .1192 | .1178 |
| ..... | ..... | ..... | 42,000 | .1324 | .1252 | .1191 | .1218 | .1270 | .1378 | .1204 | .1050 | .1261 | .1090 | .1224 | .1210 |
| ..... | ..... | ..... | 43,000 | .1345 | .1279 | .1235 | .1250 | .1287 | .1415 | .1225 | .1084 | .1305 | .1120 | .1254 | .1240 |
| ..... | ..... | ..... | 44,000 | .1381 | .1310 | .1252 | .1280 | .1336 | .1442 | .1265 | .1118 | .1319 | .1158 | .1286 | .1272 |
| ..... | ..... | ..... | 45,000 | .1404 | .1345 | .1292 | .1314 | .1352 | .1466 | .1296 | .1154 | .1360 | .1180 | .1316 | .1302 |
| ..... | ..... | ..... | 46,000 | .1441 | .1376 | .1315 | .1340 | .1391 | .1498 | .1320 | .1170 | .1388 | .1216 | .1345 | .1331 |
| ..... | ..... | ..... | 47,000 | .1460 | .1403 | .1345 | .1379 | .1416 | .1530 | .1348 | .1210 | .1420 | .1248 | .1375 | .1361 |
| ..... | ..... | ..... | 48,000 | .1500 | .1432 | .1390 | .1400 | .1455 | .1553 | .1380 | .1235 | .1445 | .1273 | .1406 | .1392 |
| ..... | ..... | ..... | 49,000 | .1518 | .1460 | .1402 | .1439 | .1475 | .1590 | .1410 | .1275 | .1480 | .1307 | .1436 | .1422 |
| ..... | ..... | ..... | 50,000 | .1557 | .1493 | .1442 | .1457 | .1509 | .1618 | .1448 | .1300 | .1492 | .1335 | .1465 | .1451 |
| ..... | ..... | ..... | 51,000 | .1578 | .1520 | .1457 | .1494 | .1530 | .1642 | .1468 | .1324 | .1537 | .1365 | .1491 | .1477 |
| ..... | ..... | ..... | 52,000 | .1609 | .1545 | .1500 | .1523 | .1570 | .1674 | .1500 | .1364 | .1550 | .1388 | .1522 | .1508 |
| ..... | ..... | ..... | 53,000 | .1634 | .1570 | .1537 | .1555 | .1589 | .1699 | .1535 | .1383 | .1595 | .1427 | .1552 | .1538 |
| ..... | ..... | ..... | 54,000 | .1668 | .1597 | .1541 | .1576 | .1626 | .1729 | .1560 | .1424 | .1615 | .1454 | .1579 | .1565 |
| ..... | ..... | ..... | 55,000 | .1690 | .1627 | .1586 | .1609 | .1653 | .1755 | .1585 | .1450 | .1648 | .1484 | .1609 | .1595 |
| ..... | ..... | ..... | 56,000 | .1720 | .1658 | .1615 | .1640 | .1688 | .1781 | .1620 | .1469 | .1675 | .1506 | .1637 | .1624 |
| ..... | ..... | ..... | 57,000 | .1754 | .1693 | .1633 | .1665 | .1706 | .1820 | .1650 | .1500 | .1704 | .1538 | .1666 | .1653 |
| ..... | ..... | ..... | 58,000 | .1771 | .1710 | .1670 | .1698 | .1740 | .1837 | .1668 | .1538 | .1726 | .1566 | .1692 | .1679 |
| ..... | ..... | ..... | 59,000 | .1802 | .1748 | .1692 | .1725 | .1769 | .1862 | .1705 | .1560 | .1764 | .1595 | .1722 | .1709 |
| ..... | ..... | ..... | 60,000 | .1830 | .1773 | .1727 | .1750 | .1795 | .1889 | .1734 | .1585 | .1798 | .1624 | .1750 | .1737 |
| ..... | ..... | ..... | 61,000 | .1860 | .1806 | .1748 | .1778 | .1822 | .1916 | .1758 | .1620 | .1804 | .1649 | .1776 | .1763 |
| ..... | ..... | ..... | 62,000 | .1879 | .1825 | .1774 | .1815 | .1855 | .1945 | .1784 | .1655 | .1840 | .1675 | .1805 | .1792 |
| ..... | ..... | ..... | 63,000 | .1909 | .1856 | .1805 | .1835 | .1878 | .1975 | .1821 | .1680 | .1859 | .1706 | .1832 | .1819 |
| ..... | ..... | ..... | 64,000 | .1934 | .1880 | .1833 | .1868 | .1911 | .1976 | .1843 | .1708 | .1896 | .1743 | .1859 | .1846 |
| ..... | ..... | ..... | 65,000 | .1963 | .1911 | .1862 | .1898 | .1933 | .2029 | .1869 | .1732 | .1913 | .1762 | .1887 | .1874 |
| ..... | ..... | ..... | 66,000 | .1967 | .1940 | .1888 | .1925 | .1965 | .2050 | .1900 | .1770 | .1941 | .1789 | .1913 | .1900 |
| ..... | ..... | ..... | 67,000 | .2018 | .1966 | .1914 | .1950 | .1976 | .2060 | .1927 | .1793 | .1977 | .1829 | .1948 | .1930 |
| ..... | ..... | ..... | 68,000 | .2039 | .1975 | .1942 | .1957 | .2024 | .2100 | .1950 | .1819 | .1980 | .1843 | .1963 | .1951 |
| ..... | ..... | ..... | 69,000 | .2072 | .2020 | .1969 | .2008 | .2047 | .2129 | .1983 | .1850 | .2035 | .1874 | .1999 | .1987 |
| ..... | ..... | ..... | 70,000 | .2089 | .2049 | .1971 | .2025 | .2065 | .2153 | .1995 | .1880 | .2052 | .1905 | .2018 | .2006 |
| ..... | ..... | ..... | 71,000 | .2115 | .2071 | .2024 | .2066 | .2095 | .2171 | .2050 | .1909 | .2076 | .1927 | .2050 | .2038 |
| ..... | ..... | ..... | 72,000 | .2144 | .2100 | .2044 | .2083 | .2120 | .2202 | .2076 | .1929 | .2100 | .1957 | .2075 | .2063 |
| ..... | ..... | ..... | 73,000 | .2169 | .2125 | .2075 | .2115 | .2149 | .2225 | .2100 | .1960 | .2140 | .1989 | .2105 | .2093 |
| ..... | ..... | ..... | 74,000 | .2190 | .2150 | .2105 | .2137 | .2177 | .2246 | .2121 | .1991 | .2155 | .1995 | .2127 | .2115 |
| ..... | ..... | ..... | 75,000 | .2219 | .2176 | .2127 | .2167 | .2205 | .2275 | .2148 | .1999 | .2180 | .2050 | .2155 | .2143 |
| ..... | ..... | ..... | 76,000 | .2232 | .2200 | .2150 | .2189 | .2226 | .2294 | .2170 | .2060 | .2200 | .2076 | .2180 | .2168 |
| ..... | ..... | ..... | 77,000 | .2260 | .2227 | .2172 | .2217 | .2254 | .2320 | .2205 | .2080 | .2230 | .2093 | .2206 | .2194 |
| ..... | ..... | ..... | 78,000 | .2287 | .2258 | .2209 | .2240 | .2283 | .2345 | .2232 | .2104 | .2254 | .2120 | .2238 | .2221 |
| ..... | ..... | ..... | 79,000 | .2307 | .2274 | .2228 | .2272 | .2300 | .2359 | .2253 | .2129 | .2274 | .2147 | .2254 | .2242 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 80,000 | .2164 | .2300 | .2176 | .2281 | .2269 | | | | | | |
| 81,000 | .2186 | .2328 | .2200 | .2304 | .2292 | | | | | | |
| 82,000 | .2213 | .2340 | .2230 | .2328 | .2316 | | | | | | |
| 83,000 | .2237 | .2365 | .2256 | .2353 | .2341 | | | | | | |
| 84,000 | .2260 | .2384 | .2278 | .2374 | .2364 | | | | | | |
| 85,000 | .2284 | .2415 | .2295 | .2397 | .2387 | | | | | | |
| 86,000 | .2310 | .2434 | .2326 | .2420 | .2410 | | | | | | |
| 87,000 | .2335 | .2455 | .2350 | .2443 | .2433 | | | | | | |
| 88,000 | .2360 | .2478 | .2366 | .2463 | .2463 | | | | | | |
| 89,000 | .2385 | .2497 | .2394 | .2487 | .2477 | | | | | | |
| 90,000 | .2410 | .2511 | .2420 | .2507 | .2497 | | | | | | |
| 91,000 | .2438 | .2537 | .2440 | .2528 | .2518 | | | | | | |
| 92,000 | .2459 | .2552 | .2466 | .2548 | .2539 | | | | | | |
| 93,000 | .2480 | .2575 | .2483 | .2568 | .2559 | | | | | | |
| 94,000 | .2504 | .2595 | .2505 | .2589 | .2580 | | | | | | |
| 95,000 | .2521 | .2613 | .2526 | .2608 | .2599 | | | | | | |
| 96,000 | .2543 | .2631 | .2549 | .2626 | .2617 | | | | | | |
| 97,000 | .2568 | .2650 | .2568 | .2646 | .2637 | | | | | | |
| 98,000 | .2585 | .2669 | .2588 | .2664 | .2655 | | | | | | |
| 99,000 | .2605 | .2686 | .2609 | .2683 | .2674 | | | | | | |
| 100,000 | .2633 | .2701 | .2633 | .2702 | .2693 | | | | | | |
| | .2664 | .2720 | .2664 | .2741 | .2732 | | | | | | |
| | .2690 | .2746 | .2690 | .2767 | .2758 | | | | | | |
| | .2716 | .2772 | .2716 | .2793 | .2784 | | | | | | |
| | .2742 | .2798 | .2742 | .2819 | .2810 | | | | | | |
| | .2768 | .2824 | .2768 | .2845 | .2836 | | | | | | |
| | .2794 | .2850 | .2794 | .2871 | .2862 | | | | | | |
| | .2820 | .2876 | .2820 | .2897 | .2888 | | | | | | |
| | .2846 | .2902 | .2846 | .2923 | .2914 | | | | | | |
| | .2872 | .2928 | .2872 | .2949 | .2940 | | | | | | |
| | .2898 | .2954 | .2898 | .2975 | .2966 | | | | | | |
| | .2924 | .2980 | .2924 | .3001 | .2992 | | | | | | |
| | .2950 | .3006 | .2950 | .3027 | .3018 | | | | | | |
| | .2976 | .3032 | .2976 | .3053 | .3044 | | | | | | |
| | .3002 | .3058 | .3002 | .3079 | .3070 | | | | | | |
| | .3028 | .3084 | .3028 | .3105 | .3096 | | | | | | |
| | .3054 | .3110 | .3054 | .3131 | .3122 | | | | | | |
| | .3080 | .3136 | .3080 | .3157 | .3148 | | | | | | |
| | .3106 | .3162 | .3106 | .3183 | .3174 | | | | | | |
| | .3132 | .3188 | .3132 | .3209 | .3200 | | | | | | |
| | .3158 | .3214 | .3158 | .3235 | .3226 | | | | | | |
| | .3184 | .3240 | .3184 | .3261 | .3252 | | | | | | |
| | .3210 | .3266 | .3210 | .3287 | .3278 | | | | | | |
| | .3236 | .3292 | .3236 | .3313 | .3304 | | | | | | |
| | .3262 | .3318 | .3262 | .3339 | .3330 | | | | | | |
| | .3288 | .3344 | .3288 | .3365 | .3356 | | | | | | |
| | .3314 | .3370 | .3314 | .3391 | .3382 | | | | | | |
| | .3340 | .3396 | .3340 | .3417 | .3408 | | | | | | |
| | .3366 | .3422 | .3366 | .3443 | .3434 | | | | | | |
| | .3392 | .3448 | .3392 | .3469 | .3460 | | | | | | |
| | .3418 | .3474 | .3418 | .3495 | .3486 | | | | | | |
| | .3444 | .3500 | .3444 | .3521 | .3512 | | | | | | |
| | .3470 | .3526 | .3470 | .3547 | .3538 | | | | | | |
| | .3496 | .3552 | .3496 | .3573 | .3564 | | | | | | |
| | .3522 | .3578 | .3522 | .3599 | .3590 | | | | | | |
| | .3548 | .3604 | .3548 | .3625 | .3616 | | | | | | |
| | .3574 | .3630 | .3574 | .3651 | .3642 | | | | | | |
| | .3600 | .3656 | .3600 | .3677 | .3668 | | | | | | |
| | .3626 | .3682 | .3626 | .3703 | .3694 | | | | | | |
| | .3652 | .3708 | .3652 | .3729 | .3720 | | | | | | |
| | .3678 | .3734 | .3678 | .3755 | .3746 | | | | | | |
| | .3704 | .3760 | .3704 | .3781 | .3772 | | | | | | |
| | .3730 | .3786 | .3730 | .3807 | .3798 | | | | | | |
| | .3756 | .3812 | .3756 | .3833 | .3824 | | | | | | |
| | .3782 | .3838 | .3782 | .3859 | .3850 | | | | | | |
| | .3808 | .3864 | .3808 | .3885 | .3876 | | | | | | |
| | .3834 | .3890 | .3834 | .3911 | .3902 | | | | | | |
| | .3860 | .3916 | .3860 | .3937 | .3928 | | | | | | |
| | .3886 | .3942 | .3886 | .3963 | .3954 | | | | | | |
| | .3912 | .3968 | .3912 | .3989 | .3980 | | | | | | |
| | .3938 | .3994 | .3938 | .4015 | .4006 | | | | | | |
| | .3964 | .4020 | .3964 | .4041 | .4032 | | | | | | |
| | .3990 | .4046 | .3990 | .4067 | .4058 | | | | | | |
| | .4016 | .4072 | .4016 | .4093 | .4084 | | | | | | |
| | .4042 | .4098 | .4042 | .4119 | .4110 | | | | | | |
| | .4068 | .4124 | .4068 | .4145 | .4136 | | | | | | |
| | .4094 | .4150 | .4094 | .4171 | .4162 | | | | | | |
| | .4120 | .4176 | .4120 | .4197 | .4188 | | | | | | |
| | .4146 | .4202 | .4146 | .4223 | .4214 | | | | | | |
| | .4172 | .4228 | .4172 | .4249 | .4240 | | | | | | |
| | .4198 | .4254 | .4198 | .4275 | .4266 | | | | | | |
| | .4224 | .4280 | .4224 | .4301 | .4292 | | | | | | |
| | .4250 | .4306 | .4250 | .4327 | .4318 | | | | | | |
| | .4276 | .4332 | .4276 | .4353 | .4344 | | | | | | |
| | .4302 | .4358 | .4302 | .4379 | .4370 | | | | | | |
| | .4328 | .4384 | .4328 | .4405 | .4396 | | | | | | |
| | .4354 | .4410 | .4354 | .4431 | .4422 | | | | | | |
| | .4380 | .4436 | .4380 | .4457 | .4448 | | | | | | |
| | .4406 | .4462 | .4406 | .4483 | .4474 | | | | | | |
| | .4432 | .4488 | .4432 | .4509 | .4500 | | | | | | |
| | .4458 | .4514 | .4458 | .4535 | .4526 | | | | | | |
| | .4484 | .4540 | .4484 | .4561 | .4552 | | | | | | |
| | .4510 | .4566 | .4510 | .4587 | .4578 | | | | | | |
| | .4536 | .4592 | .4536 | .4613 | .4604 | | | | | | |
| | .4562 | .4618 | .4562 | .4639 | .4630 | | | | | | |
| | .4588 | .4644 | .4588 | .4665 | .4656 | | | | | | |
| | .4614 | .4670 | .4614 | .4691 | .4682 | | | | | | |
| | .4640 | .4696 | .4640 | .4717 | .4708 | | | | | | |
| | .4666 | .4722 | .4666 | .4743 | .4734 | | | | | | |
| | .4692 | .4748 | .4692 | .4769 | .4760 | | | | | | |
| | .4718 | .4774 | .4718 | .4795 | .4786 | | | | | | |
| | .4744 | .4800 | .4744 | .4821 | .4812 | | | | | | |
| | .4770 | .4826 | .4770 | .4847 | .4838 | | | | | | |
| | .4796 | .4852 | .4796 | .4873 | .4864 | | | | | | |
| | .4822 | .4878 | .4822 | .4899 | .4890 | | | | | | |
| | .4848 | .4904 | .4848 | .4925 | .4916 | | | | | | |
| | .4874 | .4930 | .4874 | .4951 | .4942 | | | | | | |
| | .4900 | .4956 | .4900 | .4977 | .4968 | | | | | | |
| | .4926 | .4982 | .4926 | .5003 | .4994 | | | | | | |
| | .4952 | .5008 | .4952 | .5029 | .5020 | | | | | | |
| | .4978 | .5034 | .4978 | .5055 | .5046 | | | | | | |
| | .5004 | .5060 | .5004 | .5081 | .5072 | | | | | | |
| | .5030 | .5086 | .5030 | .5107 | .5098 | | | | | | |
| | .5056 | .5112 | .5056 | .5133 | .5124 | | | | | | |
| | .5082 | .5138 | .5082 | .5159 | .5150 | | | | | | |
| | .5108 | .5164 | .5108 | .5185 | .5176 | | | | | | |
| | .5134 | .5190 | .5134 | .5211 | .5202 | | | | | | |
| | .5160 | .5216 | .5160 | .5237 | .5228 | | | | | | |
| | .5186 | .5242 | .5186 | .5263 | .5254 | | | | | | |
| | .5212 | .5268 | .5212 | .5289 | .5280 | | | | | | |
| | .5238 | .5294 | .5238 | .5315 | .5306 | | | | | | |
| | .5264 | .5320 | .5264 | .5341 | .5332 | | | | | | |
| | .5290 | .5346 | .5290 | .5367 | .5358 | | | | | | |
| | .5316 | .5372 | .5316 | .5393 | .5384 | | | | | | |
| | .5342 | .5398 | .5342 | .5419 | .5410 | | | | | | |
| | .5368 | .5424 | .5368 | .5445 | .5436 | | | | | | |
| | .5394 | .5450 | .5394 | .5471 | .5462 | | | | | | |
| | .5420 | .5476 | .5420 | .5497 | .5488 | | | | | | |
| | .5446 | .5502 | .5446 | .5523 | .5514 | | | | | | |
| | .5472 | .5528 | .5472 | .5549 | .5540 | | | | | | |
| | .5498 | .5554 | .5498 | .5575 | .5566 | | | | | | |
| | .5524 | .5580 | .5524 | .5601 | .5592 | | | | | | |
| | .5550 | .5606 | .5550 | .5627 | .5618 | | | | | | |
| | .5576 | .5632 | .5576 | .5653 | .5644 | | | | | | |
| | .5602 | .5658 | .5602 | .5679 | .5670 | | | | | | |
| | .5628 | .5684 | .5628 | .5705 | .5696 | | | | | | |
| | .5654 | .5710 | .5654 | .5731 | .5722 | | | | | | |
| | .5680 | .5736 | .5680 | .5757 | .5748 | | | | | | |
| | .5706 | .5762 | .5706 | .5783 | .5774 | | | | | | |
| | .5732 | .5788 | .5732 | .5809 | .5800 | | | | | | |
| | .5758 | .5814 | .5758 | .5835 | .5826 | | | | | | |
| | .5784 | .5840 | .5784 | .5861 | .5852 | | | | | | |
| | .5810 | .5866 | .5810 | .5887 | .5878 | | | | | | |
| | .5836 | .5892 | .5836 | .5913 | .5904 | | | | | | |
| | .5862 | .5918 | .5862 | .5939 | .5930 | | | | | | |
| | .5888 | .5944 | .5888 | .5965 | .5956 | | | | | | |
| | .5914 | .5970 | .5914 | .5991 | .5982 | | | | | | |
| | .5940 | .5996 | .5940 | .6017 | .6008 | | | | | | |
| | .5966 | .6022 | .5966 | .6043 | .6034 | | | | | | |
| | .5992 | .6048 | .5992 | .6069 | .6060 | | | | | | |
| | .6018 | .6074 | .6018 | .6095 | .6086 | | | | | | |
| | .6044 | .6100 | .6044 | .6121 | .6112 | | | | | | |
| | .6070 | .6126 | .6070 | .6147 | .6138 | | | | | | |
| | .6096 | .6152 | .6096 | .6173 | .6164 | | | | | | |
| | .6122 | .6178 | .6122 | .6199 | .6190 | | | | | | |
| | .6148 | .6204 | .6148 | .6225 | .6216 | | | | | | |
| | .6174 | .6230 | .6174 | .6251 | .6242 | | | | | | |
| | .6200 | .6256 | .6200 | .6277 | .6268 | | | | | | |
| | .6226 | .6282 | .6226 | .6303 | .6294 | | | | | | |
| | .6252 | .6308 | .6252 | .6329 | .6320 | | | | | | |
| | .6278 | .6334 | .6278 | .6355 | .6346 | | | | | | |
| | .6304 | .6360 | .6304 | .6381 | .6372 | | | | | | |
| | .6330 | .6386 | .6330 | .6407 | .6398 | | | | | | |
| | .6356 | .6412 | .6356 | .6433 | .6424 | | | | | | |
| | .6382 | .6438 | .6382 | .6459 | .6450 | | | | | | |
| | .6408 | .6464 | .6408 | .6485 | .6476 | | | | | | |
| | .6434 | .6490 | .6434 | .6511 | .6502 | | | | | | |
| | .6460 | .6516 | .6460 | .6537 | .6528 | | | | | | |
| | .6486 | .6542 | .6486 | .6563 | .6554 | | | | | | |
| | .6512 | .6568 | .6512 | .6589 | .6580 | | | | | | |
| | .6538 | .6594 | .6538 | .6615 | .6606 | | | | | | |
| | .6564 | .6620 | .6564 | .6641 | .6632 | | | | | | |
| | .6590 | .6646 | .6590 | .6667 | .6658 | | | | | | |
| | .6616 | .6672 | .6616 | .6693 | .6684 | | | | | | |
| | .6642 | .6698 | .6642 | .6719 | .6710 | | | | | | |
| | .6668 | .6724 | .6668 | .6745 | .6736 | | | | | | |
| | .6694 | .6750 | .6694 | .6771 | .6762 | | | | | | |
| | .6720 | .6776 | .6720 | .6797 | .6788 | | | | | | |
| | .6746 | .6802 | .6746 | .6823 | .6814 | | | | | | |
| | .6772 | .6828 | .6772 | .6849 | .6840 | | | | | | |
| | .6798 | .6854 | .6798 | .6875 | .6866 | | | | | | |
| | .6824 | .6880 | .6824 | .6901 | .6892 | | | | | | |
| | .6850 | .6906 | .6850 | .6927 | .6918 | | | | | | |
| | .6876 | .6932 | .6876 | .6953 | .6944 | | | | | | |
| | .6902 | .6958 | .6902 | .6979 | .6970 | | | | | | |
| | .6928 | .6984 | .6928 | .7005 | .6996 | | | | | | |
| | .6954 | .7010 | .6954 | .7031 | .7022 | | | | | | |
| | .6980 | .7036 | .6980 | .7057 | .7048 | | | | | | |
| | .7006 | .7062 | .7006 | .7083 | .7074 | | | | | | |
| | .7032 | .7088 | .7032 | .7109 | .7100 | | | | | | |
| | .7058 | .7114 | .7058 | .7135 | .7126 | | | | | | |
| | .7084 | .7140 | .7084 | .7161 | .7152 | | | | | | |
| | .7110 | .7166 | .7110 | .7187 | .7178 | | | | | | |
| | .7136 | .7192 | .7136 | .7213 | .7204 | | | | | | |
| | .7162 | .7218 | .7162 | .7239 | .7230 | | | | | | |
| | .7188 | .7244 | .7188 | .7265 | .7256 | | | | | | |
| | .7214 | .7270 | .7214 | .7291 | .7282 | | | | | | |
| | .7240 | .7296 | .7240 | .7317 | .7308 | | | | | | |
| | .7266 | .7322 | .7266 | .7343 | .7334 | | | | | | |
| | .7292 | .7348 | .7292 | .7369 | .7360 | | | | | | |
| | .7318 | .7374 | .7318 | .7395 | .7386 | | | | | | |
| | .7344 | .7400 | .7344 | .7421 | .7412 | | | | | | |
| | .7370 | .7426 | .7370 | .7447 | .7438 | | | | | | |
| | .7396 | .7452 | .7396 | .7473 | .7464 | | | | | | |
| | .7422 | .7478 | .7422 | .7499 | .7490 | | | | | | |
| | .7448 | .7504 | .7448 | .7525 | .7516 | | | | | | |
| | .7474 | .7530 | .7474 | .7551 | .7542 | | | | | | |
| | .7500 | .7556 | .7500 | .7577 | .7568 | | | | | | |
| | .7526 | .7582 | .7526 | .7603 | .7594 | | | | | | |
| | .7552 | .7608 | .7552 | .7629 | .7620 | | | | | | |
| | .7578 | .7634 | .7578 | .7655 | .7646 | | | | | | |
| | .7604 | .7660 | .7604 | .7681 | .7672 | | | | | | |
| | .7630 | .7686 | .7630 | .7707 | .7698 | | | | | | |
| | .7656 | .7712 | .7656 | .7733 | .7724 | | | | | | |
| | .7682 | .7738 | .7682 | .7759 | .7750 | | | | | | |
| | .7708 | .7764 | .7708 | .7785 | .7776 | | | | | | |
| | .7734 | .7790 | .7734 | .7811 | .7802 | | | | | | |
| | .7760 | .7816 | .7760 | .7837 | .7828 | | | | | | |
| | .7786 | .7842 | .7786 | .7863 | .7854 | | | | | | |
| | .7812 | .7868 | .7812 | .7889 | .7880 | | | | | | |
| | .7838 | .7894 | .7838 | .7915 | .7906 | | | | | | |
| | .7864 | .7920 | .7864 | .7941 | .7932 | | | | | | |
| | .7890 | .7946 | .7890 | .7967 | .7958 | | | | | | |
| | .7916 | .7972 | .7916 | .7993 | .7984 | | | | | | |
| | .7942 | .7998 | .7942 | .8019 | .8010 | | | | | | |
| | .7968 | .8024 | .7968 | .8045 | .8036 | | | | | | |
| | .7994 | .8050 | .7994 | .8071 | .8062 | | | | | | |
| | .8020 | .8076 | .8020 | .8097 | .8088 | | | | | | |
| | .8046 | .8102 | .8046 | .8123 | .8114 | | | | | | |
| | .8072 | .8128 | .8072 | .8149 | .8140 | | | | | | |
| | .8098 | .8154 | .8098 | .8175 | .8166 | | | | | | |
| | .8124 | .8180 | .8124 | .8201 | .8192 | | | | | | |
| | .8150 | .8206 | .8150 | .8227 | .8218 | | | | | | |
| | .8176 | .8232 | .8176 | .8253 | .8244 | | | | | | |
| | .8202 | .8258 | .8202 | .8279 | .8270 | | | | | | |
| | .8228 | .8284 | .8228 | .8305 | .8296 | | | | | | |
| | .8254 | .8310 | .8254 | .8331 | .8322 | | | | | | |
| | .8280 | .8336 | .8280 | .8357 | .8348 | | | | | | |
| | .8306 | .8362 | .8306 | .8383 | .8374 | | | | | | |
| | .8332 | .8388 | .8332 | .8409 | .8400 | | | | | | |
| | .8358 | .8414 | .8358 | .8435 | .8426 | | | | | | |
| | .8384 | .8440 | .8384 | .8461 | .8452 | | | | | | |
| | .8410 | .8466 | .8410 | .8487 | .8478 | | | | | | |
| | .8436 | .8492 | .8436 | .8513 | .8504 | | | | | | |
| | .8462 | .8518 | .8462 | .8539 | .8530 | | | | | | |
| | .8488 | .8544 | .8488 | .8565 | .8556 | | | | | | |
| | .8514 | .8570 | .8514 | .8591 | .8582 | | | | | | |
| | .8540 | .8596 | .8540 | .8617 | .8608 | | | | | | |
| | .8566 | .8622 | .8566 | .8643 | .8634 | | | | | | |
| | .8592 | .8648 | .8592 | .8669 | .8660 | | | | | | |
| | .8618 | .8674 | .8618 | .8695 | .8686 | | | | | | |
| | .8644 | .8700 | .8644 | .8721 | .8712 | | | | | | |
| | .8670 | .8726 | .8670 | .8747 | .8738 | | | | | | |
| | .8696 | .8752 | .8696 | .8773 | .8764 | | | | | | |
| | .8722 | .8778 | .8722 | .8799 | .8790 | | | | | | |
| | .8748 | .8804 | .8748 | .8825 | .8816 | | | | | | |
| | .8774 | .8830 | .8774 | .8851 | .8842 | | | | | | |
| | .8800 | .8856 | .8800 | .8877 | .8868 | | | | | | |
| | .8826 | .8882 | .8826 | .8903 | .8894 | | | | | | |
| | .8852 | .8908 | .8852 | .8929 | .8920 | | | | | | |
| | .8878 | .8934 | .8878 | .8955 | .8946 | | | | | | |
| | .8904 | .8960 | .8904 | .8981 | .8972 | | | | | | |
| | .8930 | .8986 | .8930 | .9007 | .8998 | | | | | | |
| | .8956 | .9012 | .8956 | .9033 | .9024 | | | | | | |
| | .8982 | .9038 | .8982 | .9059 | .9050 | | | | | | |
| | .9008 | .9064 | .9008 | .9085 | .9076 | | | | | | |
| | .9034 | .9090 | .9034 | .9111 | .9102 | | | | | | |
| | .9060 | .9116 | .9060 | .9137 | .9128 | | | | | | |
| | .9086 | .9142 | .9086 | .9163 | .9154 | | | | | | |
| | .9112 | .9168 | .9112 | .9189 | .9180 | | | | | | |
| | .9138 | .9194 | .9138 | .9215 | .9206 | | | | | | |
| | .9164 | .9220 | .9164 | .9241 | .9232 | | | | | | |
| | .9190 | .9246 | .9190 | .9267 | .9258 | | | | | | |
| | .9216 | .9272 | .9216 | .9293 | .9284 | | | | | | |
| | .9242 | .9298 | .9242 | .9319 | .9310 | | | | | | |
| | .9268 | .9324 | .9268 | .9345 | .9336 | | | | | | |
| | .9294 | .9350 | .9294 | .9371 | .9362 | | | | | | |
| | .9320 | .9376 | .9320 | .9397 | .9388 | | | | | | |
| | .9346 | .9402 | .9346 | .9423 | .9414 | | | | | | |
| | .9372 | .9428 | .9372 | .9449 | .9440 | | | | | | |
| | .9398 | .9454 | .9398 | .9475 | .9466 | | | | | | |
| | .9424 | .9480 | .9424 | .9501 | .9492 | | | | | | |
| | .9450 | .9506 | .9450 | .9527 | .9518 | | | | | | |
| | .9476 | .9532 | .9476 | .9553 | .9544 | | | | | | |
| | .9502 | .9558 | .9502 | .9579 | .9570 | | | | | | |
| | .9528 | .9584 | .9528 | .9605 | .9596 | | | | | | |
| | .9554 | .9610 | .9554 | .9631 | .9622 | | | | | | |
| | .9580 | .9636 | .9580 | .9657 | .9648 | | | | | | |
| | .9606 | .9662 | .9606 | .9683 | .9674 | | | | | | |
| | .9632 | .9688 | .9632 | .9709 | .9700 | | | | | | |
| | .9658 | .9714 | .9658 | .9735 | .9726 | | | | | | |
| | .9684 | .9740 | .9684 | .9761 | .9752 | | | | | | |
| | .9710 | .9766 | .9710 | .9787 | .9778 | | | | | | |
| | .9736 | .9792 | .9736 | .9813 | .9804 | | | | | | |
| | .9762 | .9818 | .9762 | .9839 | .9830 | | | | | | |
| | .9788 | .9844 | .9788 | .9865 | .9856 | | | | | | |
| | .9814 | .9870 | .9814 | .9891 | .9882 | | | | | | |
| | .9840 | .9896 | .9840 | .9917 | .9908 | | | | | | |
| | .9866 | .9922 | .9866 | .9943 | .9934 | | | | | | |
| | .9892 | .9948 | .9892 | .9969 | .9960 | | | | | | |
| | .9918 | .9974 | .9918 | .9995 | .9986 | | | | | | |
| | .9944 | .0000 | .9944 | .0021 | .0012 | | | | | | |
| | .9970 | .0026 | .9970 | .0047 | .0038 | | | | | | |
| | .9996 | .0052 | .9996 | .0073 | .0064 | | | | | | |
| | .0022 | .0078 | .0022 | .0099 | .0090 | | | | | | |
| | .0048 | .0104 | .0048 | .0125 | .0116 | | | | | | |
| | .0074 | .0130 | .0074 | .0151 | .0142 | | | | | | |
| | .0100 | .0156 | .0100 | .0177 | .0168 | | | | | | |
| | .0126 | .0182 | .0126 | .0203 | .0194 | | | | | | |
| | .0152 | .0208 | .0152 | .0229 | .0220 | | | | | | |
| | .0178 | .0234 | .0178 | .0255 | .0246 | | | | | | |
| | .0204 | .0260 | .0204 | .0281 | .0272 | | | | | | |
| | .0230 | .0286 | .0230 | .0307 | .0298 | | | | | | |
| | .0256 | .0312 | .0256 | .0333 | .0324 | | | | | | |
| | .0282 | .0338 | .0282 | .0359 | .0350 | | | | | | |
| | .0308 | .0364 | .0308 | .0385 | .0376 | | | | | | |
| | .0334 | .0390 | .0334 | .0411 | .0402 | | | | | | |
| | .0360 | .0416 | .0360 | .0437 | .0428 | | | | | | |
| | .0386 | .0442 | .0386 | .0463 | .0454 | | | | | | |
| | .0412 | .0468 | .0412 | .0489 | .0480 | | | | | | |
| | .0438 | .0494 | .0438 | .0515 | .0506 | | | | | | |
| | .0464 | .0520 | .0464 | .0541 | .0532 | | | | | | |
| | .0490 | .0546 | .0490 | .0567 | .0558 | | | | | | |
| | .0516 | .0572 | .0516 | .0593 | .0584 | | | | | | |
| | .0542 | .0598 | .0542 | .0619 | .0610 | | | | | | |
| | .0568 | .0624 | .0568 | .0645 | .0636 | | | | | | |
| | .0594 | .0650 | .0594 | .0671 | .0662 | | | | | | |
| | .0620 | .0676 | .0620 | .0697 | .0688 | | | | | | |
| | .0646 | .0702 | .0646 | .0723 | .0714 | | | | | | |
| | .0672 | .0728 | .0672 | .0749 | .0740 | | | | | | |
| | .0698 | .0754 | .0698 | .0775 | .0766 | | | | | | |
| | .0724 | .0780 | .0724 | .0801 | .0792 | | | | | | |
| | .0750 | .0806 | .0750 | .0827 | .0818 | | | | | | |
| | .0776 | .0832 | .0776 | .0853 | .0844 | | | | | | |
| | .0802 | .0858 | .0802 | .0879 | .0870 | | | | | | |
| | .0828 | .0884 | .0828 | .0905 | .0896 | | | | | | |
| | .0854 | .0910 | .0854 | .0931 | .0922 | | | | | | |
| | .0880 | .0936 | .0880 | .0957 | .0948 | | | | | | |
| | .0906 | .0962 | .0906 | .0983 | .0974 | | | | | | |
| | .0932 | .0988 | .0932 | .1009 | .1000 | | | | | | |
| | .0958 | .1014 | .0958 | .1035 | .1026 | | | | | | |
| | .0984 | .1040 | .0984 | .1061 | .1052 | | | | | | |
| | .1010 | .1066 | .1010 | .1087 | .1078 | | | | | | |
| | .1036 | .1092 | .1036 | .1113 | .1104 | | | | | | |
| | .1062 | .1118 | .1062 | .1139 | .1130 | | | | | | |
| | .1088 | .1144 | .1088 | .1165 | .1156 | | | | | | |
| | .1114 | .1170 | .1114 | .1191 | .1182 | | | | | | |
| | .1140 | .1196 | .1140 | .1217 | .1208 | | | | | | |
| | .1166 | .1222 | .1166 | .1243 | .1234 | | | | | | |
| | .1192 | .1248 | .1192 | .1269 | .1260 | | | | | | |
| | .1218 | .1274 | .1218 | .1295 | .1286 | | | | | | |
| | .1244 | .1300 | .1244 | .1321 | .1312 | | | | | | |
| | .1270 | .1326 | .1270 | .1347 | .1338 | | | | | | |
| | .1296 | .1352 | .1296 | .1373 | .1364 | | | | | | |
| | .1322 | .1378 | .1322 | .1399 | .1390 | | | | | | |
| | .1348 | .1404 | .1348 | .1425 | .1416 | | | | | | |
| | .1374 | .1430 | .1374 | .1451 | .1442 | | | | | | |
| | .1400 | .1456 | .1400 | .1477 | .1468 | | | | | | |
| | .1426 | .1482 | .1426 | .1503 | .1494 | | | | | | |
| | .1452 | .1508 | .1452 | .1529 | .1520 | | | | | | |
| | .1478 | .1534 | .1478 | .1555 | .1546 | | | | | | |
| | .1504 | .1560 | .1504 | .1581 | .1572 | | | | | | |
| | .1530 | .1586 | .1530 | .1607 | .1598 | | | | | | |
| | .1556 | .1612 | .1556 | .1633 | .1624 | | | | | | |
| | .1582 | .1638 | .1582 | .1659 | .1650 | | | | | | |
| | .1608 | .1664 | .1608 | .1685 | .1676 | | | | | | |
| | .1634 | .1690 | .1634 | .1711 | .1702 | | | | | | |
| | .1660 | .1716 | .1660 | .1737 | .1728 | | | | | | |
| | .1686 | .1742 | .1686 | .1763 | .1754 | | | | | | |
| | .1712 | .1768 | .1712 | .1789 | .1780 | | | | | | |
| | .1738 | .1794 | .1738 | .1815 | .1806 | | | | | | |
| | .1764 | .1820 | .1764 | .1841 | .1832 | | | | | | |
| | .1790 | .1846 | .1790 | .1867 | .1858 | | | | | | |
| | .1816 | .1872 | .1816 | .1893 | .1884 | | | | | | |
| | .1842 | .1898 | .1842 | .1919 | .1910 | | | | | | |
| | .1868 | .1924 | .1868 | .1945 | .1936 | | | | | | |
| | .1894 | .1950 | .1894 | .1971 | .1962 | | | | | | |
| | .1920 | .1976 | .1920 | .1997 | .1988 | | | | | | |
| | .1946 | .2002 | .1946 | .2023 | .2014 | | | | | | |
| | .1972 | .2028 | .1972 | .2049 | .2040 | | | | | | |
| | .1998 | .2054 | .1998 | .2075 | .2066 | | | | | | |
| | .2024 | .2080 | .2024 | .2101 | .2092 | | | | | | |
| | .2050 | .2106 | .2050 | .2127 | .2118 | | | | | | |
| | .2076 | .2132 | .2076 | .2153 | .2144 | | | | | | |
| | .2102 | .2158 | .2102 | .2179 | .2170 | | | | | | |
| | .2128 | .2184 | .2128 | .2205 | .2196 | | | | | | |
| | .2154 | .2210 | .2154 | .2231 | .2222 | | | | | | |
| | .2180 | .2236 | .2180 | .2257 | .2248 | | | | | | |
| | .2206 | .2262 | .2206 | .2283 | .2274 | | | | | | |
| | .2232 | .2288 | .2232 | .2309 | .2300 | | | | | | |
| | .2258 | .2314 | .2258 | .2335 | .2326 | | | | | | |
| | .2284 | .2340 | .2284 | .2361 | .2352 | | | | | | |
| | .2310 | .2366 | .2310 | .2387 | .2378 | | | | | | |
| | .2336 | .2392 | .2336 | .2413 | .2404 | | | | | | |
| | .2362 | .2418 | .2362 | .2439 | .2430 | | | | | | |
| | .2388 | .2444 | .2388 | .2465 | .2456 | | | | | | |
| | .2414 | .2470 | .2414 | .2491 | .2482 | | | | | | |
| | .2440 | .2496 | .2440 | .2517 | .2508 | | | | | | |
| | .2466 | .2522 | .2466 | .2543 | .2534 | | | | | | |
| | .2492 | .2548 | .2492 | .2569 | .2560 | | | | | | |
| | .2518 | .2574 | .2518 | .2595 | .2586 | | | | | | |
| | .2544 | .2600 | .2544 | .2621 | .2612 | | | | | | |
| | .2570 | .2626 | .2570 | .2647 | .2638 | | | | | | |
| | .2596 | .2652 | .2596 | .2673 | .2664 | | | | | | |
| | .2622 | .2678 | .2622 | .2699 | .2690 | | | | | | |
| | .2648 | .2704 | .2648 | .2725 | .2716 | | | | | | |
| | .2674 | .2730 | .2674 | .2751 | .2742 | | | | | | |
| | .2700 | .2756 | .2700 | .2777 | .2768 | | | | | | |
| | .2726 | .2782 | .2726 | .2803 | .2794 | | | | | | |
| | .2752 | .2808 | .2752 | .2829 | .2820 | | | | | | |
| | .2778 | .2834 | .2778 | .2855 | .2846 | | | | | | |
| | .2804 | .2860 | .2804 | .2881 | .2872 | | | | | | |
| | .2830 | .2886 | .2830 | .2907 | .2898 | | | | | | |
| | .2856 | .2912 | .2856 | .2933 | .2924 | | | | | | |
| | .2882 | .2938 | .2882 | .2959 | .2950 | | | | | | |
| | .2908 | .2964 | .2908 | .2985 | .2976 | | | | | | |
| | .2934 | .2990 | .2934 | .3011 | .3002 | | | | | | |
| | .2960 | .3016 | .2960 | .3037 | .3028 | | | | | | |
| | .2986 | .3042 | .2986 | .3063 | .3054 | | | | | | |
| | .3012 | .3068 | .3012 | .3089 | .3080 | | | | | | |
| | .3038 | .3094 | .3038 | .3115 | .3106 | | | | | | |
| | .3064 | .3120 | .3064 | .3141 | .3132 | | | | | | |
| | .3090 | .3146 | .3090 | .3167 | .3158 | | | | | | |
| | .3116 | .3172 | .3116 | .3193 | .3184 | | | | | | |
| | .3142 | .3198 | .3142 | .3219 | .3210 | | | | | | |
| | .3168 | .3224 | .3168 | .3245 | .3236 | | | | | | |
| | .3194 | .3250 | .3194 | .3271 | .3262 | | | | | | |
| | .3220 | .3276 | .3220 | .3297 | .3288 | | | | | | |
| | .3246 | .3302 | .3246 | .3323 | .3314 | | | | | | |
| | .3272 | .3328 | .3272 | .3349 | .3340 | | | | | | |
| | .3298 | .3354 | .3298 | .3375 | .3366 | | | | | | |
| | .3324 | .3380 | .3324 | .3401 | .3392 | | | | | | |
| | .3350 | .3406 | .3350 | .3427 | .3418 | | | | | | |
| | .3376 | .3432 | .3376 | .3453 | .3444 | | | | | | |
| | .3402 | .3458 | .3402 | .3479 | .3470 | | | | | | |
| | .3428 | .3484 | .3428 | .3505 | .3496 | | | | | | |
| | .3454 | .3510 | .3454 | .3531 | .3522 | | | | | | |
| | .3480 | .3536 | .3480 | .3557 | .3548 | | | | | | |
| | .3506 | .3562 | .3506 | .3583 | .3574 | | | | | | |
| | .3532 | .3588 | .3532 | .3609 | .3600 | | | | | | |
| | .3558 | .3614 | .3558 | .3635 | .3626 | | | | | | |
| | .3584 | .3640 | .3584 | .3661 | .3652 | | | | | | |
| | .3610 | .3666 | .3610 | .3687 | .3678 | | | | | | |
| | .3636 | .3692 | .3636 | .3713 | .3704 | | | | | | |
| | .3662 | .3718 | .3662 | .3739 | .3730 | | | | | | |
| | .3688 | .3744 | .3688 | .3765 | .3756 | | | | | | |
| | .3714 | .3770 | .3714 | .3791 | .3782 | | | | | | |
| | .3740 | .3796 | .3740 | .3817 | .3808 | | | | | | |
| | .3766 | .3822 | .3766 | .3843 | .3834 | | | | | | |
| | .3792 | .3848 | .3792 | .3869 | .3860 | | | | | | |
| | .3818 | .3874 | .3818 | .3895 | .3886 | | | | | | |
| | .3844 | .3900 | .3844 | .3921 | .3912 | | | | | | |
| | .3870 | .3926 | .3870 | .3947 | .3938 | | | | | | |
| | .3896 | .3952 | .3896 | .3973 | .3964 | | | | | | |
| | .3922 | .3978 | .3922 | .3999 | .3990 | | | | | | |
| | .3948 | .4004 | .3948 | .4025 | .4016 | | | | | | |
| | .3974 | .4030 | .3974 | .4051 | .4042 | | | | | | |
| | .4000 | .4056 | .4000 | .4077 | .4068 | | | | | | |
| | .4026 | .4082 | .4026 | .4103 | .4094 | | | | | | |
| | .4052 | .4108 | .4052 | .4129 | .4120 | | | | | | |
| | .4078 | .4134 | .4078 | .4155 | .4146 | | | | | | |
| | .4104 | .4160 | .4104 | .4181 | .4172 | | | | | | |
| | .4130 | .4186 | .4130 | .4207 | .4198 | | | | | | |
| | .4156 | .4212 | .4156 | .4233 | .4224 | | | | | | |
| | .4182 | .4238 | .4182 | .4259 | .4250 

## Hardness of Bronze from Lyle Life-Saving Guns.

Specimens, 1″ long; 1″ diameter.
Pyramidal indenting tool used, loaded with 10,000 pounds.

| Marks. | Length of cut. | Hardness. | Marks. | Length of cut. | Hardness. |
|---|---|---|---|---|---|
| | *Inch.* | | | *Inch.* | |
| 4 | .962 | 3.74 | 63 | .883 | 4.85 |
| 5 | .898 | 4.60 | 64 | .859 | 5.26 |
| 6 | .912 | 4.39 | 65 | .901 | 4.56 |
| 7 | .896 | 4.63 | 66 | .874 | 4.99 |
| 11 | .862 | 5.20 | 67 | .842 | 5.58 |
| 35 | .888 | 4.76 | 68 | .907 | 4.47 |
| 36 | .854 | 5.35 | 69 | .902 | 4.54 |
| 37 | .818 | 6.09 | 70 | .914 | 4.37 |
| 38 | .857 | 5.30 | 71 | .887 | 4.77 |
| 39 | .864 | 5.17 | 72 | .908 | 4.45 |
| 40 | .840 | 5.62 | 73 | .902 | 4.54 |
| 41 | .873 | 5.01 | 74 | .903 | 4.52 |
| 42 | .879 | 4.91 | 75 | .925 | 4.21 |
| 43 | .882 | 4.86 | 77 | .905 | 4.50 |
| 44 | .910 | 4.42 | 78 | .888 | 4.76 |
| 45 | .925 | 4.22 | 79 | .868 | 5.10 |
| 46 | .856 | 5.33 | 80 | .873 | 5.01 |
| 47 | .881 | 4.88 | 81 | .881 | 4.88 |
| 49 | .877 | 4.95 | 82 | .905 | 4.50 |
| 50 | .861 | 5.22 | 83 | .890 | 4.73 |
| 52 | .856 | 5.33 | 84 | .863 | 5.19 |
| 53 | .887 | 4.78 | 85 | .898 | 4.60 |
| 55 | .928 | 4.17 | 86 | .891 | 4.72 |
| 57 | .887 | 4.78 | 87 | .911 | 4.41 |
| 59 | .877 | 4.95 | 88 | .890 | 4.73 |
| 60 | .878 | 4.93 | 89 | .899 | 4.59 |
| 61 | .890 | 4.73 | 96 | .907 | 4.47 |
| 62 | .899 | 4.59 | | | |

# COMPRESSION TESTS OF CONCRETE CUBES FOR THE CITY OF CLEVELAND, OHIO.

*DESCRIPTION OF MANUFACTURE OF SPECIMENS BY M. W. KINGSLEY, SUPERINTENDENT OF WATERWORKS.*

The blocks numbered from 25 to 32, inclusive, are made of 1 part, by measure, of vulcanite Portland cement, 2 parts of slag dust, and 4 parts of crushed slag.

The blocks numbered from 41 to 48, inclusive, are made of 1 part, by measure, of vulcanite Portland cement, 2 parts of lake sand, and 4 parts of broken Kelley Island limestone.

The cement and fine material were first mixed dry by a thorough shoveling, and just enough water was added so as to make the water flush when the mixture was pounded or squeezed. The stone or slag was wetted sufficiently so that it did not absorb any of the water from the cement and was then added to the mixture of cement and fine material, and the whole thoroughly shoveled over. It was then rammed into wooden boxes, in layers of about 2 inches in thickness, sufficient to flush the water to the surface of each layer.

No. 9936.

Marks, 32.
Sectional area, 144.60 square inches.
Gauged length, 5″.

| Applied loads. | | In gauged length. | | Remarks. |
|---|---|---|---|---|
| Total. | Per square inch. | Compression. | Set. | |
| *Pounds.* | *Pounds.* | *Inch.* | *Inch.* | |
| 14,460 | 100 | 0. | 0. | Initial load. |
| 28,920 | 200 | .0001 | ..... | |
| 57,840 | 400 | .0004 | ..... | |
| 86,760 | 600 | .0007 | ..... | |
| 115,680 | 800 | .0011 | ..... | |
| 144,600 | 1,000 | .0014 | .0001 | |
| 173,520 | 1,200 | .0018 | ..... | |
| 202,440 | 1,400 | .0022 | ..... | |
| 231,360 | 1,600 | .0027 | ..... | |
| 260,280 | 1,800 | .0033 | ..... | |
| 289,200 | 2,000 | .0039 | .0007 | |
| 318,120 | 2,200 | .0044 | ..... | |
| 347,040 | 2,400 | .0052 | ..... | |
| 375,960 | 2,600 | .0061 | ..... | |
| 404,880 | 2,800 | .0075 | ..... | |
| 433,800 | 3,000 | .0090 | .0028 | |
| 465,000 | ..... | ..... | ..... | First crack. |
| 467,700 | 3,234 | ..... | ..... | Ultimate strength. |

No. 9940.

Marks, 48.
Sectional area, 145.32 square inches.
Gauged length, 5″.

| Applied loads. | | In gauged length. | | Remarks. |
|---|---|---|---|---|
| Total. | Per square inch. | Compression. | Set. | |
| *Pounds.* | *Pounds.* | *Inch.* | *Inch.* | |
| 14,532 | 100 | 0. | 0. | Initial load. |
| 29,064 | 200 | .0001 | ..... | |
| 58,128 | 400 | .0004 | ..... | |
| 87,192 | 600 | .0007 | ..... | |
| 116,256 | 800 | .0011 | ..... | |
| 145,320 | 1,000 | .0015 | .0001 | |
| 174,384 | 1,200 | .0019 | ..... | |
| 203,448 | 1,400 | .0023 | ..... | |
| 232,512 | 1,600 | .0028 | ..... | |
| 261,576 | 1,800 | .0032 | ..... | |
| 290,640 | 2,000 | .0037 | .0007 | |
| 319,704 | 2,200 | .0041 | ..... | |
| 348,768 | 2,400 | .0046 | ..... | |
| 377,832 | 2,600 | .0053 | ..... | |
| 406,896 | 2,800 | .0061 | ..... | |
| 435,960 | 3,000 | .0069 | .0017 | |
| 505,000 | ..... | ..... | ..... | First crack. |
| 511,500 | 3,520 | ..... | ..... | Ultimate strength. |

No. 10250.

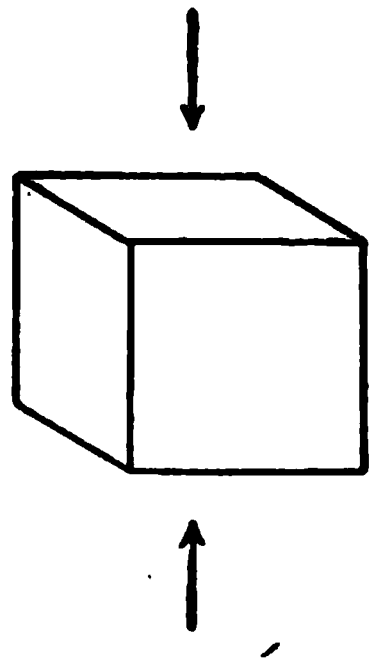
Marks, 28.
Sectional area, 146.28 square inches.
Gauged length, 5″.

| Applied loads. | | In gauged length. | | Remarks. |
|---|---|---|---|---|
| Total. | Per square inch. | Compression. | Set. | |
| *Pounds.* | *Pounds.* | *Inch.* | *Inch.* | |
| 14,628 | 100 | 0. | 0. | Initial load. |
| 29,256 | 200 | .0001 | ..... | |
| 58,512 | 400 | .0002 | ..... | |
| 87,768 | 600 | .0006 | ..... | |
| 117,024 | 800 | .0008 | ..... | |
| 140,280 | 1,000 | .0012 | .0001 | |
| 175,536 | 1,200 | .0015 | ..... | |
| 204,792 | 1,400 | .0018 | ..... | |

## No. 10254.

Marks, 44.
Sectional area, 146.65 square inches.
Gauged length, 5″.

| Applied loads. | | In gauged length. | | Remarks. |
|---|---|---|---|---|
| Total. | Per square inch. | Compression. | Set. | |
| *Pounds.* | *Pounds.* | *Inch.* | *Inch.* | |
| 14,665 | 100 | 0. | 0. | Initial load. |
| 29,330 | 200 | .0001 | ..... | |
| 58,660 | 400 | .0002 | ..... | |
| 87,990 | 600 | .0006 | ..... | |
| 117,320 | 800 | .0010 | ..... | |
| 146,650 | 1,000 | .0013 | .0001 | |
| 175,980 | 1,200 | .0019 | ..... | |
| 205,310 | 1,400 | .0022 | ..... | |
| 234,640 | 1,600 | .0028 | ..... | |
| 263,970 | 1,800 | .0032 | ..... | |
| 293,300 | 2,000 | .0036 | .0005 | |
| 322,630 | 2,200 | .0040 | ..... | |
| 351,960 | 2,400 | .0043 | ..... | |
| 381,290 | 2,600 | .0045 | ..... | |
| 410,620 | 2,800 | .0050 | ..... | |
| 439,950 | 3,000 | .0054 | .0008 | |
| 469,280 | 3,200 | .0057 | ..... | |
| 498,610 | 3,400 | .0063 | ..... | |
| 527,940 | 3,600 | .0072 | ..... | |
| 557,270 | 3,800 | .0081 | ..... | |
| 582,000 | ..... | ..... | ..... | First crack. |
| 586,600 | 4,000 | .0091 | .0007 | |
| 606,500 | 4,136 | ..... | ..... | Ultimate strength. |



CUBES TESTED APRIL 30, 1900.

[Age, 52 days. 3 days in air, 28 days in water, then 21 days in air.]

| No. of test. | Marks. | Weight. | | Dimensions. | | | Sectional area. | First crack. | Ultimate strength. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Total. | Per cubic foot. | Height. | Compressed surface. | | | | Total. | Per square inch. |
| | | *Pounds.* | *Pounds.* | *Inches.* | *Inches.* | *Inches.* | *Sq. ins.* | *Pounds.* | *Pounds.* | *Pounds.* |
| 9933 | 29 | 135⅜ | 133.1 | 12.04 | 12.10 | 12.10 | 146.41 | 489,200 | 489,200 | 3,341 |
| 9934 | 30 | 134⅜ | 134.0 | 11.88 | 12.10 | 12.09 | 146.29 | 418,000 | 445,600 | 3,046 |
| 9935 | 31 | 133 | 131.6 | 12.00 | 12.09 | 12.04 | 145.56 | 435,000 | 439,000 | 3,016 |
| 9936 | 32 | 134½ | 133.2 | 12.04 | 11.98 | 12.07 | 144.60 | 465,000 | 467,700 | 3,234 |
| 9937 | 45 | 147 | 145.2 | 12.04 | 12.09 | 12.02 | 145.82 | 513,000 | 549,800 | 3,788 |
| 9938 | 46 | 146½ | 145.6 | 11.95 | 12.07 | 12.05 | 145.44 | 498,000 | 509,900 | 3,506 |
| 9939 | 47 | 147 | 144.7 | 12.08 | 11.98 | 12.13 | 145.32 | 584,000 | 536,700 | 3,693 |
| 9940 | 48 | 147 | 145.2 | 12.04 | 12.02 | 12.09 | 145.82 | 505,000 | 511,500 | 3,520 |

CUBES TESTED JUNE 2, 1900.

[Age, 85 days. 3 days in air, 58 days in water, then 24 days in air.]

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 10247 | 25 | 138⅛ | 136.0 | 12.10 | 12.00 | 12.12 | 145.44 | 572,000 | 581,000 | 3,995 |
| 10248 | 26 | 137 | 134.8 | 12.16 | 12.15 | 11.89 | 144.46 | 579,900 | 579,900 | 4,014 |
| 10249 | 27 | 142 | 135.8 | 12.18 | 12.21 | 12.15 | 148.35 | 568,000 | 612,500 | 4,129 |
| 10250 | 28 | 138 | 134.4 | 12.13 | 12.11 | 12.08 | 146.28 | 555,400 | 555,400 | 3,797 |
| 10251 | 41 | 145⅛ | 146.9 | 11.95 | 12.10 | 11.84 | 143.26 | 558,000 | 612,000 | 4,272 |
| 10252 | 42 | 145⅛ | 145.4 | 11.90 | 11.99 | 12.12 | 145.32 | 567,000 | 610,700 | 4,202 |
| 10253 | 43 | 147⅛ | 147.0 | 11.90 | 11.99 | 12.15 | 145.68 | 594,000 | 660,500 | 4,534 |
| 10254 | 44 | 147⅛ | 146.1 | 11.90 | 12.10 | 12.12 | 146.65 | 582,000 | 606,500 | 4,136 |

# CONCRETE FROM THE CONTRACTORS' PLANT COMPANY, BOSTON, MASS.

1107

## DESCRIPTION OF CONCRETE FURNISHED BY THE CONTRACTORS PLANT COMPANY.

Composition, Giant Portland cement 1, sand 3, crushed stone 5.

The stone passed through a 2½″ ring with all passing a ¼″ ring screened out.

Specimens marked A and B were mixed in a portable gravity concrete mixer 8 feet in length, in the following manner:

The stone was spread evenly on a platform in front of the mixer, the sand spread evenly on top of the stone, and the cement then spread evenly on top of the sand.

The material was then shoveled into the mixer, "a steel trough containing numerous rows of steel pins, staggered in order to thoroughly mix the sand, cement, and broken stone as they gravitate through the trough.

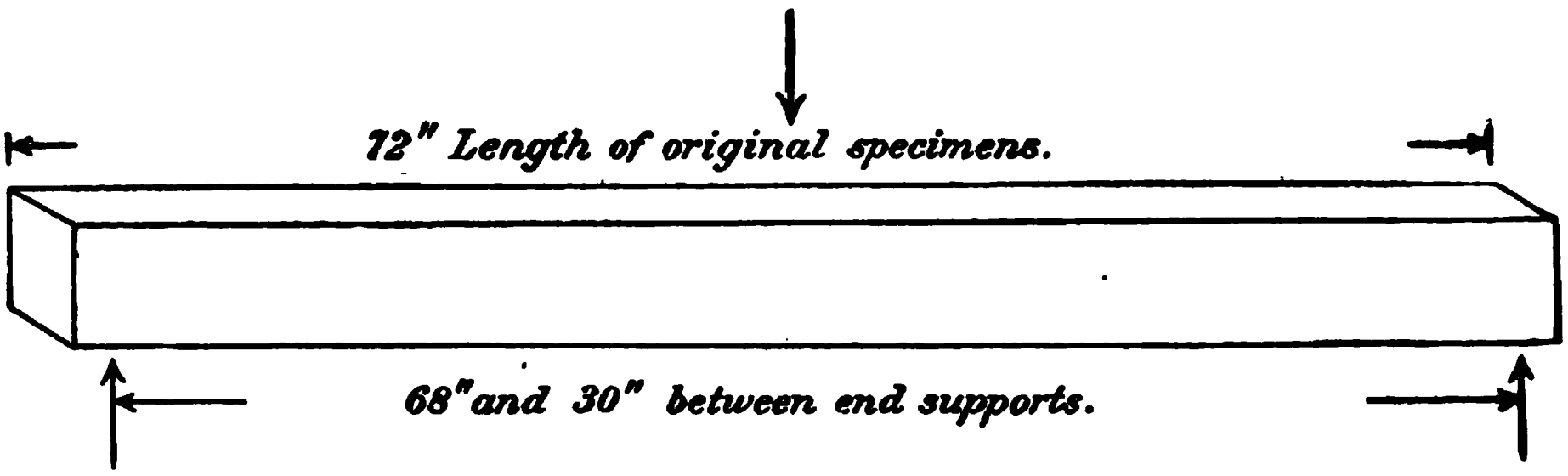
"Water from a spray pipe strikes the mixer about midway its length. By this arrangement the concrete is mixed dry in the upper half and wet in the lower half."

In making specimens A the concrete as discharged from the mixer was allowed to form a cone-shaped pile below, permitting the layer of stones to accumulate around the edges. Permitting the formation of a cone-shaped pile below the mixer was contrary to the instructions of the makers of the machine, but in this case done at the demand of other parties. Sample A1 in particular was believed to contain an excess of stone.

While making the concrete for samples B, the material as discharged was kept leveled off by means of a hoe.

Samples C were made of hand-mixed concrete.

## TRANSVERSE TESTS.

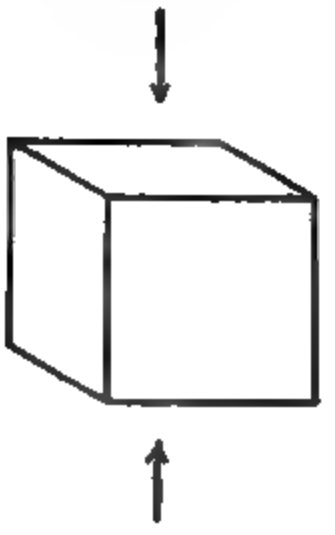



[Age, 2 days in air, 2 months in water, then 1 month in air.]

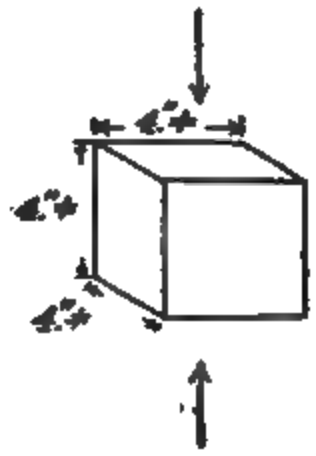
| No. of test. | Marks. | Dimensions. | | Distance between end supports. | Ultimate strength. | | Remarks. |
|---|---|---|---|---|---|---|---|
| | | Breadth. | Depth. | | Total. | Modulus of rupture. | |
| | | *Inches.* | *Inches.* | *Inches.* | *Pounds.* | *Pounds.* | |
| 11059 | $A_5$ | 5.90 | 6.08 | 68 | 1,008 | 472 | Retest of one-half of No. 11059. |
| 11059*a* | ..... | 5.80 | 6.13 | 30 | 2,180 | 450 | Retest of other half of No. 11059. |
| 11059*b* | ..... | 6.13 | 5.97 | 30 | 2,814 | 564 | |
| 11060 | $C_6$ | 6.09 | 6.13 | 30 | 2,308 | 454 | |
| 11061 | ..... | 6.05 | 6.13 | 30 | 2,033 | 402 | |
| 11062 | $B_5$ | 5.97 | 6.08 | 30 | 2,294 | 468 | |
| 11063 | ..... | 5.93 | 6.13 | 30 | 2,655 | 536 | |
| 11064 | $A_6$ | 4.06 | 5.96 | 30 | 1,759 | 549 | |
| 11065 | ..... | 4.07 | 6.01 | 30 | 1,758 | 538 | |
| 11066 | $C_5$ | 4.17 | 5.90 | 30 | 1,402 | 435 | |
| 11067 | ..... | 4.13 | 5.98 | 30 | 1,204 | 367 | |
| 11068 | $B_6$ | 4.28 | 6.08 | 30 | 1,223 | 348 | |

NOTE.—Specimens $A_6$, $B_5$, $B_6$, $C_5$, and $C_6$ were broken midway their length in transportation. Tests were made on the fractured ends, using 30" distance between end supports.

COMPRESSION TESTS.

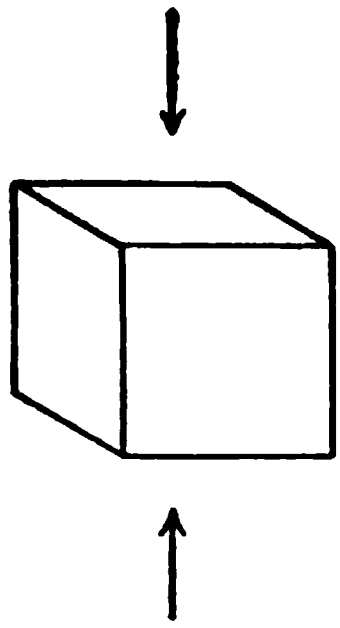


## Compression Tests of Tennessee Marble, Furnished by the Evans Marble Company, Knoxville, Tenn.



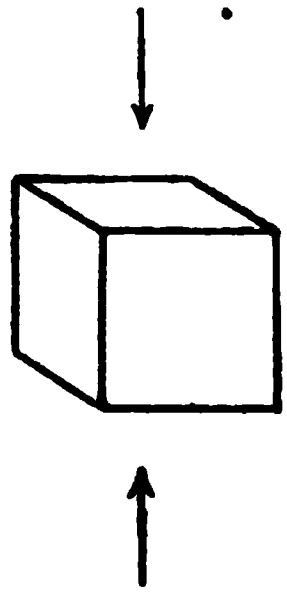
| Marks. | | | Dimensions. | | | Sectional area. | First crack. | Ultimate strength. | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Height. | Compressed surface. | | | | Total. | Per sq. inch. |
| | | | *Inches.* | *Inches.* | *Inches.* | *Sq inches.* | *Pounds.* | *Pounds.* | *Pounds.* |
| 9729 | Evans Marble Co., Knoxville, Tenn | No. 1, pink | 4.00 | 4.00 | 4.00 | 16.00 | 349,200 | 349,200 | 21,825 |
| 9730 | ....do | No. 2, dark cedar | 3.99 | 4.00 | 4.00 | 16.00 | 326,500 | 326,500 | 20,406 |
| 9731 | ....do | No. 3, dark cedar | 4.00 | 4.00 | 4.00 | 16.00 | 295,800 | 295,800 | 18,487 |
| 9732 | ....do | No. 4, pink | 4.01 | 4.01 | 4.01 | 16.08 | 314,000 | 314,000 | 19,527 |
| 9733 | ....do | No. 5, champion pink | 4.00 | 4.01 | 4.00 | 16.04 | 301,000 | 301,000 | 18,766 |
| 9734 | ....do | No. 6, Ellis pink | 4.00 | 4.00 | 4.00 | 16.00 | 337,000 | 337,000 | 21,062 |
| 9735 | Tennessee Producers' Marble Co., Knoxville, Tenn | Z 1 | 4.08 | 4.03 | 4.04 | 16.28 | 346,800 | 346,800 | 21,302 |
| 9736 | ....do | Z 2 | 4.05 | 4.01 | 4.04 | 16.20 | 199,000 | 201,000 | 12,407 |
| 9737 | ....do | Z 3 | 4.05 | 4.02 | 4.00 | 16.08 | 360,700 | 360,700 | 22,432 |
| 9738 | The American Marble Co., Knoxville, Tenn | Gray Tennessee | 3.99 | 3.98 | 3.99 | 15.92 | 296,500 | 296,500 | 18,561 |
| 9739 | ....do | Champion pink | 4.00 | 4.00 | 4.00 | 16.00 | 342,800 | 342,800 | 21,425 |
| 9740 | The United States Marble Co., Knoxville, Tenn | Pink cedar | 4.00 | 4.00 | 4.00 | 16.00 | 372,400 | 372,400 | 23,275 |
| 9741 | .. | Dark cedar | 3.99 | 3.98 | 3.99 | 15.88 | 399,500 | 399,500 | 25,478 |
| 9742 | ] arble Co., Knoxville, Tenn | Republic dark | 3.97 | 4.00 | 4.01 | 16.04 | 261,600 | 261,600 | 16,309 |
| 9743 | .. | Republic pink | 4.00 | 3.99 | 4.05 | 16.16 | 324,000 | 324,000 | 20,050 |
| 9744 | ] Co., Knoxville, Tenn | Ross pink | 4.01 | 4.02 | 3.96 | 15.92 | 352,800 | 352,800 | 22,129 |
| 9745 | .. | Ross gray | 3.96 | 3.95 | 3.97 | 15.68 | 306,500 | 306,500 | 19,547 |
| 9746 | ] Marble Co., Knoxville, Tenn | | 4.00 | 4.00 | 4.00 | 16.00 | 340,200 | 340,200 | 21,262 |
| 9747 | .. | | 4.00 | 4.00 | 4.00 | 16.00 | 333,000 | 333,000 | 20,812 |
| 9748 | ( Marble Co., Knoxville, Tenn | Cedar pink | 4.00 | 4.00 | 4.01 | 16.04 | 345,000 | 345,000 | 21,509 |

# COMPRESSION TESTS OF LIMESTONE FROM THE CARTHAGE QUARRY COMPANY, CARTHAGE, MO.



| No. of test. | Marks. | Dimensions. | | | Sectional area. | First crack. | Ultimate strength. | |
|---|---|---|---|---|---|---|---|---|
| | | Height. | Compressed surface. | | | | Total. | Per square inch. |
| | | *Inches.* | *Inches.* | *Inches.* | *Sq. inches.* | *Pounds.* | *Pounds.* | *Pounds.* |
| 11086 | Quality No. 1 ... | 3.99 | 3.98 | 3.99 | 15.88 | 217,200 | 217,200 | 13,680 |
| 11087 | .....do..... | 3.99 | 4.01 | 4.00 | 16.04 | 219,100 | 219,100 | 13,660 |
| 11088 | Quality No. 2 ... | 4.01 | 4.00 | 3.99 | 15.96 | 241,000 | 244,500 | 15,320 |
| 11089 | .....do..... | 4.00 | 4.01 | 3.98 | 15.96 | 273,400 | 273,400 | 17,130 |

# COMPRESSION TESTS OF GRANITE CUBES FROM MOUNT WALDO QUARRIES, FRANKFORT, ME.



| No. of test. | How tested. | Specific gravity. | Dimensions. | | | Sectional area. | First crack. | Ultimate strength. | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Height. | Compressed surface. | | | | Total. | Per square inch. |
| | | | *Inches.* | *Inches.* | *Inches.* | *Square inches.* | *Pounds.* | *Pounds.* | *Pounds.* |
| 11055 | On bed. | 2.637 | 2.01 | 2.01 | 2.01 | 4.04 | 120,000 | 128,400 | 31,782 |
| 11056 | ....do... | 2.655 | 2.00 | 2.01 | 2.02 | 4.06 | 123,300 | 132,500 | 32,635 |
| 11057 | On side. | 2.662 | 2.01 | 2.01 | 2.02 | 4.06 | 107,400 | 122,600 | 30,197 |
| 11058 | ....do... | 2.649 | 2.01 | 2.01 | 2.01 | 4.04 | 112,600 | 117,900 | 29,183 |

## "Black Granite" from State of Maine.

Compressed surfaces faced with plaster of paris.

| No. of test. | Dimensions. | | | Sectional area. | First crack. | Ultimate strength. | |
|---|---|---|---|---|---|---|---|
| | Height. | Compressed surface. | | | | Total. | Per square inch. |
| | *Inches.* | *Inches.* | *Inches.* | *Square inches.* | *Pounds.* | *Pounds.* | *Pounds.* |
| 11104 | 4.26 | 4.45 | 3.17 | 14.11 | 274,000 | 296,800 | 21,035 |

Felt cushions used ".4 thick between the plaster-of-paris facing and platforms of the testing machine.

| No. of test. | How tested. | Dimensions. | | | Sectional area. | First crack. | Ultimate strength. | |
|---|---|---|---|---|---|---|---|---|
| | | Height. | Compressed surface. | | | | Total. | Per square inch. |
| | | *Inches.* | *Inches.* | *Inches.* | *Square inches.* | *Pounds.* | *Pounds.* | *Pounds.* |
| 10245 | On bed... | 4.06 | 3.99 | 4.18 | 16.68 | 313,600 | 313,600 | 18,801 |
| 10246 | On side... | 4.03 | 4.00 | 4.17 | 16.68 | 236,200 | 236,200 | 14,161 |

A fragment of this kind of stone, weighing about 2½ pounds, was heated to a low red color and plunged into cold water without spalling. It was again heated to a bright red color and plunged into cold water, whereupon small fragments were detached and the body of the specimen was readily broken into small, irregular-shaped fragments when struck with a hand hammer. A strong sulphurous odor was emitted by the hot stone.

*Chemical composition.*

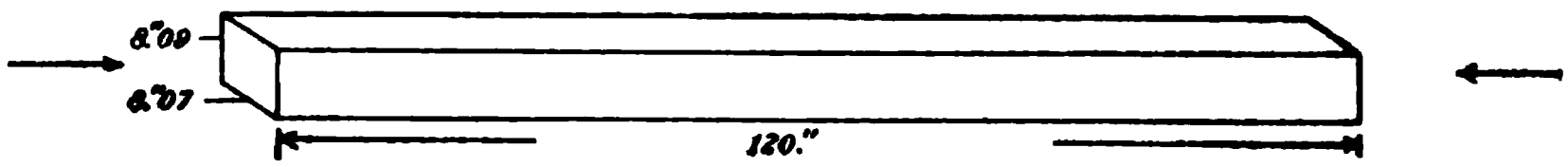
| | |
|---|---|
| Silica | 50.00 |
| Oxide of iron | 10.18 |
| Alumina | 33.22 |
| Lime | 4.95 |
| Magnesia | 1.08 |
| Manganous oxide | 0.52 |

# CYPRESS WOOD FOR UNITED STATES ENGINEER CORPS.

## COMPRESSION AND TRANSVERSE TESTS.

## COMPRESSION TESTS.

### No. 9682.




Weight, 202 pounds=44.6 pounds per cubic foot.
Sectional area, 65.28 square inches.
Gauged length, 50″.

| Applied loads. | | In gauged length. | | Deflections at middle. | | Remarks. |
|---|---|---|---|---|---|---|
| Total. | Per square inch. | Compression. | Set. | Horizontal. | Vertical. | |
| *Pounds.* | *Pounds.* | *Inches.* | *Inches.* | *Inches.* | *Inches.* | |
| 6,528 | 100 | 0. | 0. | 0. | 0. | Initial load. |
| 13,056 | 200 | .0038 | 0. | 0. | 0. | |
| 19,584 | 300 | .0075 | 0. | 0. | 0. | |
| 26,112 | 400 | .0113 | 0. | 0. | 0. | |
| 32,640 | 500 | .0152 | 0. | 0. | 0. | |
| 39,168 | 600 | .0192 | 0. | 0. | 0. | |
| 45,696 | 700 | .0232 | 0. | 0. | 0. | |
| 52,224 | 800 | .0269 | 0. | 0. | .01 | |
| 58,752 | 900 | .0309 | 0. | 0. | .01 | |
| 65,280 | 1,000 | .0342 | .0005 | 0. | .02 | |
| 80,000 | 460 | ..... | ..... | ..... | ..... | Rested sixteen hours under this load. |
| 65,280 | 1,000 | .0344 | −.0004 | ..... | ..... | |
| 78,336 | 1,200 | .0427 | −.0002 | 0. | .02 | |
| 91,392 | 1,400 | .0507 | −.0003 | 0. | .02 | |
| 104,448 | 1,600 | .0588 | −.0001 | 0. | .02 | |
| 117,504 | 1,800 | .0670 | .0000 | 0. | .03 | |
| 130,560 | 2,000 | .0753 | +.0001 | 0. | .04 | |
| 143,616 | 2,200 | .0832 | .0001 | −.01 | .03 | |
| 156,672 | 2,400 | .0917 | .0003 | −.01 | .03 | |
| 169,728 | 2,600 | .0998 | .0003 | −.01 | .04 | |
| 182,784 | 2,800 | .1092 | .0047 | −.02 | .04 | |
| 182,784 | 2,800 | .1119 | .0029 | −.02 | .04 | |
| 195,840 | 3,000 | .1207 | .0039 | −.02 | .06 | |
| 208,896 | 3,200 | .1315 | .0038 | −.04 | .11 | |
| 219,000 | 3,355 | ..... | ..... | ..... | ..... | Ultimate strength. |

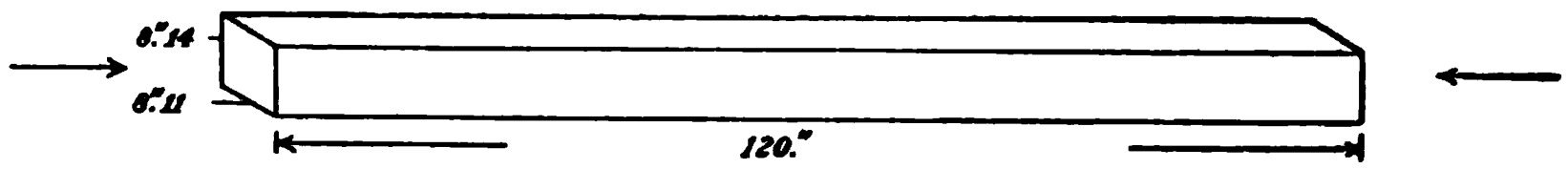
*Deflection sets.*

| Horizontal. | Vertical. |
|---|---|
| −.01 | .00 |

Failed by triple flexture. Fibers crushed at middle of length and near the ends. Sap exuded from the sections crushed.

| | Grains. |
|---|---|
| Weight of section 1 inch long, in condition tested | 10,830 |
| Weight of section 1 inch long, dry | 6,865 |
| Loss | 3,965=36.6 per cent. |

## No. 9683.



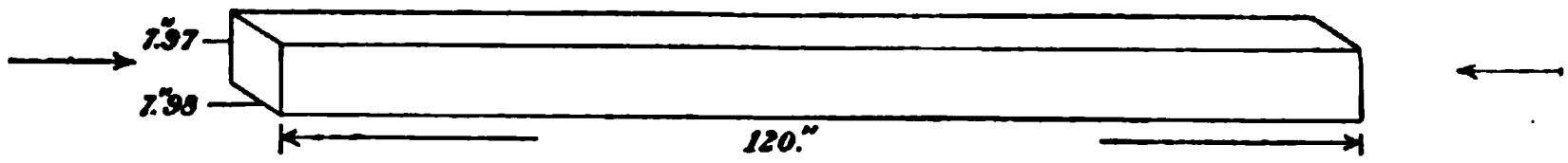

Weight, 171 pounds=37.3 pounds per cubic foot.
Sectional area, 66.01 square inches.
Gauged length, 50".

| Applied loads. | | In guaged length. | | Deflections at middle. | | Remarks. |
|---|---|---|---|---|---|---|
| Total. | Per square inch. | Compression. | Set. | Horizontal. | Vertical. | |
| *Pounds.* | *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 6,601 | 100 | 0. | 0. | 0. | 0. | Initial load. |
| 13,202 | 200 | .0033 | —.0002 | 0. | 0. | |
| 19,803 | 300 | .0071 | —.0003 | 0. | 0. | |
| 26,404 | 400 | .0110 | —.0002 | 0. | 0. | |
| 33,005 | 500 | .0150 | —.0001 | 0. | 0. | |
| 39,606 | 600 | .0189 | —.0001 | 0. | 0. | |
| 46,207 | 700 | .0229 | —.0001 | 0. | 0. | |
| 52,808 | 800 | .0268 | +.0002 | 0. | 0. | |
| 59,409 | 900 | .0309 | .0002 | 0. | 0. | |
| 66,010 | 1,000 | .0349 | .0002 | 0. | 0. | |
| 79,212 | 1,200 | .0427 | .0004 | 0. | 0. | |
| 92,414 | 1,400 | .0505 | .0004 | 0. | 0. | |
| 105,616 | 1,600 | .0584 | .0001 | 0. | 0. | |
| 118,818 | 1,800 | .0662 | .0002 | 0. | 0. | |
| 132,020 | 2,000 | .0745 | .0003 | 0. | 0. | |
| 145,222 | 2,200 | .0825 | .0003 | 0. | 0. | |
| 158,424 | 2,400 | .0908 | .0006 | .01 | 0. | |
| 6,601 | 100 | ..... | ..... | ..... | 0. | Rested 1 hour under this load. |
| 171,626 | 2,600 | .1000 | .0004 | .02 | 0. | |
| 184,828 | 2,800 | .1085 | .0007 | .02 | 0. | |
| 198,030 | 3,000 | .1176 | .0015 | .02 | 0. | |
| 211,232 | 3,200 | .1289 | .0025 | .02 | 0. | |
| 224,434 | 3,400 | .1495 | .0063 | .03 | 0. | |
| 228,200 | 3,457 | ..... | ..... | ..... | ..... | Ultimate strength. |

Fibres crushed at a place 45" from the end of the column.

| | Grains. |
|---|---|
| Weight of section 1 inch long in condition tested | 9,990 |
| Weight of section 1 inch long, dry | 6,750 |
| Loss | 3,240=32.4 per cent. |

## No. 9684.



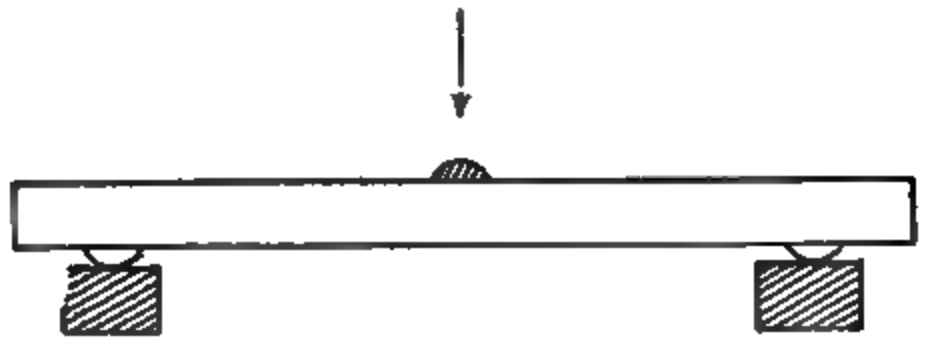

Weight, 281 pounds=63.6 pounds per cubic foot.
Sectional area, 63.60 square inches.
Gauged length, 50″.

| Applied loads. | | In gauged length. | | Deflections at middle. | | Remarks. |
|---|---|---|---|---|---|---|
| Total. | Per square inch. | Compression. | Set. | Horizonal. | Vertical. | |
| *Pounds.* | *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 6,360 | 100 | 0. | 0. | 0. | 0. | Initial load. |
| 12,720 | 200 | .0059 | 0. | 0. | 0. | |
| 19,080 | 300 | .0120 | —.0001 | 0. | 0. | |
| 25,440 | 400 | .0180 | 0. | 0. | 0. | |
| 31,800 | 500 | .0239 | 0. | 0. | 0. | |
| 38,160 | 600 | .0298 | .0003 | 0. | 0. | |
| 44,520 | 700 | .0361 | .0005 | .01 | 0. | |
| 50,880 | 800 | .0422 | .0005 | .01 | 0. | |
| 57,240 | 900 | .0482 | .0005 | .02 | 0. | |
| 63,600 | 1,000 | .0541 | .0007 | .02 | 0. | |
| 76,320 | 1,200 | .0662 | .0010 | .03 | 0. | |
| 89,040 | 1,400 | .0781 | .0008 | .03 | 0. | |
| 101,760 | 1,600 | .0905 | .0010 | .04 | —.01 | |
| 114,480 | 1,800 | .1026 | .0015 | .04 | —.02 | |
| 127,200 | 2,000 | .1153 | .0019 | .05 | .02 | |
| 139,920 | 2,200 | .1279 | .0025 | .05 | —.03 | |
| 152,640 | 2,400 | .1410 | .0030 | .06 | —.03 | |
| 165,360 | 2,600 | .1558 | .0042 | .06 | —.04 | |
| 178,080 | 2,800 | .1705 | .0050 | .09 | —.05 | |
| 190,800 | 3,000 | .1910 | .0072 | .10 | —.07 | |
| 198,000 | 3,113 | ..... | ..... | ..... | ..... | Ultimate strength. |

Failed 24″ from end of column at a group of knots ¼″ diameter.

| | Grains. |
|---|---|
| Weight of section 1 inch long in condition tested | 16,575 |
| Weight of section 1 inch long, dry | 8,235 |
| Loss | 8,340=50.3 per cent. |

## Transverse Tests.



### Sticks supported at the ends: loaded at the middle.

| No. of test. | Weight. | | Dimensions. | | | Distance between end supports. | Width of face of plunger. | Ultimate strength. | | Fractures. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total. | Per cubic foot. | Length. | Breadth. | Depth | | | Total. | Modulus of rupture | |
| | *Pounds.* | *Pounds.* | *Inches.* | *Inches.* | *Inches.* | *Inches.* | *Inches.* | *Pounds.* | *Pounds.* | |
| 494 | 23 | 27 | 48.3 | 5.52 | 5.52 | 42 | 1.85 | 9,850 | 3,889 | a long, length. a coarse, 1.85 fa... |
| 495 | 25½ | 30 | 48.2 | 5.52 | 5.52 | 42 | 3 | 10,680 | 4,000 | ...acture on the tension side. Middle plunger indented the wood ".08. |
| 496 | 23½ | 27.6 | 48.3 | 5.52 | 5.52 | 42 | 3 | 11,170 | 4,184 | Coarse, splintering fracture on the tension side. Middle plunger indented the wood ".03. |
| 497 | 37 | 36.2 | 72 | 2.80 | 8.75 | 64 | 3 | 12,350 | 4,667 | Coarse, splintering fracture on the tension side. Middle plunger indented the wood ".40 |
| 498 | 32½ | 32.2 | 72 | 2.77 | 8.76 | 64 | 4 | 12,940 | 4,931 | Coarse, splintering fracture on the tension side. Middle plunger indented |
| 499 | 31½ | 31.2 | 72 | 2.77 | 8.76 | 64 | 4 | 11,020 | 4,200 | ...fracture on the tension side. Middle plunger indented |

*OLD WHITE PINE AND RED OAK WOOD FROM ROOF TRUSSES OF OLD SOUTH CHURCH, BOSTON, MASS.*

Church built in 1729. Old wooden trusses removed in 1899 and iron trusses put in.

The white-pine sticks were hewn, the oak sawed. Pine roof boards, not represented in these tests, were sawed. Handmade nails were found driven into or through the pine and oak timbers and the boarding.

The material tested is believed to belong to the original timbering of the roof, and therefore to have been in the roof a period of 170 years. The tests show normal strength for wood of these kinds, and in the condition of the samples with reference to the number and size of the knots present.

No. 9685.

## WHITE PINE, HEWN STICK.

Rings of growth per inch, 7.
Length, 57″.60.
Sectional area, 9″.65 x 7″.33 = 70.73 square inches.
Gauged length, 30″.
Stick contains 6 knots, $\frac{3}{8}$″ to 1$\frac{1}{2}$″ diameter.

| Applied loads. | | In gauged length. | | Deflections at middle. | | Remarks. |
|---|---|---|---|---|---|---|
| Total. | Per square inch. | Compression. | Set. | Horizontal. | Vertical. | |
| *Pounds.* | *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 7,078 | 100 | 0. | 0. | 0. | 0. | |
| 14,146 | 200 | .0013 | −.0001 | ..... | ..... | Initial load. |
| 21,219 | 300 | .0029 | −.0002 | ..... | ..... | |
| 28,292 | 400 | .0044 | −.0003 | ..... | ..... | |
| 35,365 | 500 | .0061 | −.0005 | ..... | ..... | |
| 42,438 | 600 | .0076 | −.0006 | ..... | ..... | |
| 49,511 | 700 | .0094 | −.0007 | ..... | ..... | |
| 56,584 | 800 | .0114 | −.0009 | ..... | ..... | |
| 63,657 | 900 | .0131 | −.0008 | ..... | ..... | |
| 70,730 | 1,000 | .0151 | −.0010 | ..... | ..... | |
| 77,803 | 1,100 | .0170 | −.0011 | ..... | ..... | |
| 84,876 | 1,200 | .0191 | −.0011 | ..... | ..... | |
| 91,949 | 1,300 | .0212 | −.0010 | ..... | ..... | |
| 99,022 | 1,400 | .0233 | −.0010 | ..... | ..... | |
| 106,095 | 1,500 | .0254 | −.0010 | ..... | ..... | |
| 113,168 | 1,600 | .0275 | −.0010 | ..... | ..... | |
| 120,241 | 1,700 | .0295 | −.0010 | ..... | ..... | |
| 127,314 | 1,800 | .0320 | −.0010 | ..... | ..... | |
| 134,387 | 1,900 | .0340 | −.0012 | ..... | ..... | |
| 141,460 | 2,000 | .0361 | −.0011 | ..... | ..... | |
| 148,533 | 2,100 | .0382 | −.0011 | ..... | ..... | |
| 155,606 | 2,200 | .0405 | −.0012 | ..... | ..... | |
| 162,679 | 2,300 | .0425 | −.0012 | ..... | ..... | Snapping sounds. |
| 169,752 | 2,400 | .0449 | −.0012 | ..... | ..... | |
| 176,825 | 2,500 | .0471 | −.0014 | ..... | ..... | |
| 183,898 | 2,600 | .0495 | −.0017 | ..... | ..... | |
| 190,971 | 2,700 | .0518 | −.0015 | ..... | ..... | |
| 198,044 | 2,800 | .0541 | −.0015 | ..... | ..... | |
| 205,117 | 2,900 | .0565 | −.0016 | ..... | ..... | |
| 212,190 | 3,000 | .0589 | −.0016 | ..... | ..... | |
| 219,263 | 3,100 | .0613 | −.0018 | ..... | ..... | |
| 226,336 | 3,200 | .0640 | −.0017 | ..... | ..... | |
| 233,409 | 3,300 | .0665 | −.0017 | ..... | ..... | |
| 240,482 | 3,400 | .0698 | −.0015 | ..... | ..... | |
| 247,555 | 3,500 | .0755 | −.0000 | ..... | ..... | |
| 254,628 | 3,600 | .0670 | +.0033 | ..... | ..... | |
| 258,800 | 3,652 | ..... | ..... | ..... | ..... | Ultimate strength. |

Fibers crushed at group of knots 20″ from end of stick.

## No. 9687.

## Red Oak.

Rings of growth per inch, 11.
Length, 47″.60.
Sectional area, 5″.46 x 3″.62=19.76 square inches.
Gauged length, 30″.
Stick contains wavy grain and small knots along one side.

| Applied loads. | | In gauged length. | | Deflections at middle. | | Remarks. |
|---|---|---|---|---|---|---|
| Total. | Per square inch. | Compression. | Set. | Horizontal. | Vertical. | |
| *Pounds.* | *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,976 | 100 | 0. | 0. | 0. | 0. | Initial load. |
| 3,952 | 200 | .0020 | −.0001 | ..... | ..... | |
| 5,928 | 300 | .0040 | −.0004 | ..... | ..... | |
| 7,904 | 400 | .0064 | −.0004 | ..... | ..... | |
| 9,880 | 500 | .0088 | −.0005 | ..... | ..... | |
| 11,856 | 600 | .0115 | −.0005 | ..... | ..... | |
| 13,832 | 700 | .0141 | −.0005 | ..... | ..... | |
| 15,808 | 800 | .0168 | −.0005 | ..... | ..... | |
| 17,784 | 900 | .0191 | −.0004 | ..... | ..... | |
| 19,760 | 1,000 | .0220 | −.0008 | ..... | ..... | |
| 23,712 | 1,200 | .0271 | −.0002 | ..... | ..... | |
| 27,664 | 1,400 | .0326 | −.0001 | ..... | ..... | |
| 31,616 | 1,600 | .0379 | .0000 | ..... | ..... | |
| 35,568 | 1,800 | .0432 | +.0002 | ..... | ..... | |
| 39,520 | 2,000 | .0484 | .0003 | ..... | ..... | |
| 43,472 | 2,200 | .0543 | .0004 | ..... | ..... | |
| 47,424 | 2,400 | .0598 | .0003 | ..... | ..... | Snapping sounds. |
| 51,376 | 2,600 | .0665 | .0011 | ..... | ..... | |
| 55,328 | 2,800 | .0734 | .0022 | ..... | ..... | |
| 59,280 | 3,000 | .0814 | .0031 | ..... | ..... | |
| 63,232 | 3,200 | .0891 | .0038 | ..... | ..... | |
| 67,184 | 3,400 | .0990 | .0058 | ..... | ..... | |
| 71,136 | 3,600 | .1114 | .0086 | ..... | ..... | |
| 72,400 | 3,664 | ..... | ..... | ..... | ..... | Ultimate strength. |

Fibers crushed at a knot 6″ from end of stick, and split along the grain.

## No. 9689.

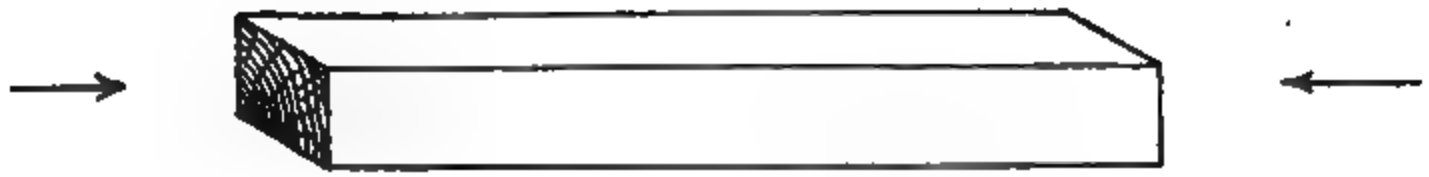
## Red Oak.

Rings of growth per inch, 11.
Length, 47″.80.
Sectional area, 5″.38 x 3″.63=19.52 square inches.
Gauged length, 30″.

| Applied load. | | In gauged length. | | Deflections at middle. | | Remarks. |
|---|---|---|---|---|---|---|
| Total. | Per square inch. | Compression. | Set. | Horizontal. | Vertical. | |
| *Pounds.* | *Pounds.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 1,952 | 100 | 0. | 0. | 0. | 0. | Initial load. |
| 3,904 | 200 | .0018 | −.0001 | | | |
| 7,808 | 400 | .0059 | −.0001 | | | |
| 11,712 | 600 | .0104 | −.0001 | | | |
| 15,616 | 800 | .0146 | −.0001 | | | |
| 19,520 | 1,000 | .0189 | 0. | | | |
| 23,424 | 1,200 | .0232 | +.0001 | | | |
| 27,328 | 1,400 | .0278 | .0001 | | | |
| 31,232 | 1,600 | .0325 | .0003 | | | |
| 35,136 | 1,800 | .0369 | .0006 | | | |
| 39,040 | 2,000 | .0411 | .0007 | | | |
| 42,944 | 2,200 | .0457 | .0009 | | | |
| 46,848 | 2,400 | .0503 | .0009 | | | |
| 50,752 | 2,600 | .0549 | .0011 | | | |
| 54,656 | 2,800 | .0604 | .0014 | | | |
| 58,560 | 3,000 | .0654 | .0016 | | | |
| 62,464 | 3,200 | .0712 | .0024 | | | |
| 66,368 | 3,400 | .0765 | .0030 | | | |
| 70,272 | 3,600 | .0840 | .0048 | | | |
| 74,176 | 3,800 | .0913 | .0059 | | | |
| 78,080 | 4,000 | .1002 | .0080 | | | |
| 81,984 | 4,200 | .1135 | .0120 | | | Snapping sounds. |
| 85,888 | 4,400 | .1405 | .0213 | | | |
| 88,600 | 4,539 | | | | | Ultimate strength. |

Fibers crushed at knots 6″ and 14″ from end of stick, and split along the grain.

## Compression Tests.



| No. of test. | Kind of wood. | Weight. | | Dimensions. | | | Sectional area. | Ultimate strength. | | Manner of failure. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Total. | Per cubic foot. | Length. | Width. | Thickness. | | Total. | Per square inch. | |
| | | *Pounds.* | *Pounds.* | *Inches.* | *Inches.* | *Inches.* | *Sq. inches.* | *Pounds.* | *Pounds.* | |
| 9685 | White pine | 54 | 22.9 | 57.60 | 9.65 | 7.33 | 70.73 | 258,300 | 3,652 | Fibers crushed at 9" from end of stick. |
| 9686 | do | 106 | 34.2 | 71.06 | 9.50 | 7.88 | 74.86 | 218,400 | 2,917 | Failed at group of knots 10 knots from the end of stick. Contains 10 knots from 1" |
| 9687 | Red oak | 24 | 44.1 | 47.60 | 5.46 | 3.62 | 19.76 | 72,400 | 3,664 | Fibers crushed at end of stick, and split along the grain. |
| 9688 | do | 27 | 41.5 | 48.60 | 6.02 | 3.84 | 23.12 | 140,100 | 6,060 | 11" from end of stick. |
| 9689 | do | 22½ | 41.6 | 47.80 | 5.33 | 3.63 | 19.52 | 88,600 | 4,539 | 6" and 14" from end of stick, and split |
| 9690 | do | 14 | 38.8 | 47.50 | 4.04 | 3.25 | 13.13 | 82,020 | 6,247 | |
| 9691 | do | 14½ | 40.6 | 47.80 | 4.06 | 3.22 | 12.96 | 68,600 | 5,295 | Oblique fracture along the grain near middle of length. |

# ENDURANCE OF ROTATING SHAFTS.

## No. 317.

Marks, $\frac{7 \times 1}{7}$

Shaft turned down from steel bar 1¼″ diameter; 0.26 carbon. Oil-tempered and annealed at high heat.
Diameter, 1″.00; speed of rotation, 500 per minute.
Length between end supports, 33″.
Loaded over 4″ length at middle.
Deflections measured on chord of 10″.

| Maximum fiber stress per square inch. | Number of rotations. | | Micrometer readings for deflections. | | | | Deflections. | Sets. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|
| | Successive. | Total. | On line. | Unloaded. | Loaded. | Unloaded. | | | |
| *Pounds.* | | | | *Inch.* | *Inch.* | *Inch.* | *Inch.* | *Inch.* | |
| 40,000 | ..... | 36,502,480 | a | .1542 | .1209 | .1541 | .0332 | .0001 | |
| | | | b | .1550 | .1218 | .1550 | .0332 | .0000 | |
| | | | c | .1549 | .1215 | .1547 | .0332 | .0002 | |
| 2,475,480 | | 38,977,960 | a | .1542 | .1207 | .1541 | .0334 | .0001 | |
| | | | b | .1550 | .1215 | .1549 | .0334 | .0001 | |
| | | | c | .1549 | .1215 | .1548 | .0333 | .0001 | |
| 2,675,120 | | 41,653,080 | a | .1542 | .1207 | .1541 | .0334 | .0001 | |
| | | | b | .1550 | .1215 | .1549 | .0334 | .0001 | |
| | | | c | .1548 | .1213 | .1547 | .0334 | .0001 | |
| 2,556,370 | | 44,209,450 | a | .1541 | .1208 | .1540 | .0332 | .0001 | |
| | | | b | .1549 | .1216 | .1549 | .0333 | .0000 | |
| | | | c | .1548 | .1215 | .1548 | .0333 | .0000 | |
| 2,308,350 | | 46,517,800 | a | .1543 | .1209 | .1542 | .0333 | .0001 | |
| | | | b | .1550 | .1216 | .1549 | .0333 | .0001 | |
| | | | c | .1550 | .1215 | .1549 | .0334 | .0001 | |
| 2,582,970 | | 49,050,770 | a | .1543 | .1209 | .1542 | .0333 | .0001 | |
| | | | b | .1550 | .1217 | .1550 | .0333 | .0000 | |
| | | | c | .1549 | .1215 | .1549 | .0334 | .0000 | |
| 1,761,600 | | 50,812,370 | ..... | ..... | ..... | ..... | ..... | ..... | Shaft ruptured at north edge of south middle bearing. |

## No. 318.

Marks, $\frac{7 \times 1}{9}$
Shaft turned down from steel bar 1¼″ diameter; 0.26 carbon. Hardened.
Diameter, 1.″00; speed of rotation, 500 per minute.
Length between end supports, 33″.
Loaded over 4″ length at middle.
Deflections measured on chord of 10″.

| Maximum fiber stress per square inch | Number of rotations. | | Micrometer readings for deflections. | | | | Deflections. | Sets. |
|---|---|---|---|---|---|---|---|---|
| | Successive. | Total. | On line. | Unloaded. | Loaded. | Unloaded. | | |
| | | | | | *Inch.* | *Inch.* | *Inch.* | *Inch.* |
| | | | | | .1236 | .1564 | .0328 | .0001 |
| | | | | | .1225 | .1553 | .0328 | .0000 |
| | | | | | .1226 | .1553 | .0327 | .0000 |
| | | | | | .1239 | .1564 | .0325 | .0000 |
| | | | | | .1228 | .1552 | .0324 | .0001 |
| | | | | | .1226 | .1551 | .0325 | .0001 |
| | | | | | .1237 | .1569 | .0332 | .0001 |
| | | | | | .1218 | .1546 | .0328 | .0001 |
| | | | | | .1217 | .1548 | .0331 | .0002 |
| | | | | | .1237 | .1569 | .0332 | .0001 |
| | | | | | .1217 | .1550 | .0333 | .0000 |
| | | | | | .1221 | .1551 | .0330 | .0001 |
| | | | | | .1240 | .1566 | .0326 | .0000 |
| | | | | | .1224 | .1552 | .0328 | .0001 |
| | | | | | .1224 | .1554 | .0330 | .0000 |

*Summarized tabulation.*

# WIRE ROPE.

*TENSION TESTS OF "DURABLE WIRE ROPE" FROM HERBERT LOUD BLOCK CO., BOSTON, MASS.*

Rope composed of 5 strands, hemp covered, of 19 wires each.
Samples prepared with eye splices at ends.

| No. of test. | Actual circumference. | Diameter of wires. | Length between splices. | Tensile strength. | Parted. |
|---|---|---|---|---|---|
| | *Inches.* | *Inch.* | *Inches.* | *Pounds.* | |
| 9759 | $2\frac{13}{16}$ | .084 | 33.25 | 14,900 | 3 strands at the splice. |
| 9760 | $3\frac{1}{16}$ | .045 | 34. | 17,890 | 2 strands at the splice. |

$\frac{3}{4}$" steel wire retraction rope.
Section 6 feet long between jaws.

| | Tensile strength. | Parted. |
|---|---|---|
| | *Pounds.* | |
| First break | 34,200 | 3 strands at face of jaws. |
| Second break | 32,180 | Do. |

## No. 9 Shot Lines—Continued.

| No. of test. | Weight of coil. | | End of coil tested. | Tensile strength. | Parted. |
|---|---|---|---|---|---|
| | *Lbs.* | *Oz.* | | *Pounds.* | |
| 10008 | 38 | 0 | Outside | 1,243 | 1 strand at the pin. |
| 10009 | 38 | 0 | do | 1,196 | 1 strand 20″ from pin. |
| 10010 | 36 | 12 | do | 1,183 | 3 strands at the pin. |
| 10011 | 36 | 12 | do | 1,190 | 1 strand 5″ from pin. |
| 10012 | 36 | 12 | Inside | 1,360 | 1 strand at the pin. |
| 10013 | 37 | 8 | Outside | 1,280 | 3 strands at the pin. |
| 10014 | 37 | 12 | do | 1,235 | 2 strands at the pin. |
| 10015 | 37 | 12 | do | 1,387 | 1 strand at the pin. |
| 10016 | 39 | 4 | do | 1,283 | Do. |
| 10017 | 37 | 12 | do | 1,301 | 1 strand 5″ from pin. |
| 10018 | 39 | 0 | do | 1,273 | 1 strand 22″ from pin. |
| 10019 | 37 | 8 | do | 1,356 | 2 strands at the pin. |
| 10020 | 37 | 12 | do | 1,298 | 1 strand at the pin. |
| 10021 | 36 | 4 | do | 1,210 | 1 strand at the middle. |
| 10022 | 37 | 12 | do | 1,326 | 1 strand 12″ from pin. |
| 10023 | 37 | 12 | do | 1,493 | 1 strand at the middle. |
| 10024 | 37 | 8 | do | 1,367 | 1 strand at the pin. |
| 10025 | 36 | 8 | Inside | 1,398 | Do. |
| 10026 | 36 | 8 | Outside | 1,340 | Do. |
| 10027 | 36 | 12 | do | 1,252 | Do. |
| 10028 | 36 | 8 | do | 1,386 | Do. |
| 10029 | 36 | 8 | do | 1,247 | 1 strand 12″ from pin. |
| 10030 | 36 | 8 | do | 1,242 | 1 strand at the pin. |
| 10031 | 38 | 0 | do | 1,268 | Do. |
| 10032 | 37 | 4 | do | 1,253 | Do. |
| 10033 | 37 | 12 | Inside | 1,185 | Do. |
| 10034 | 38 | 0 | Outside | 1,234 | 1 strand 24″ from pin. |
| 10035 | 38 | 0 | do | 1,288 | 1 strand at the middle. |
| 10036 | 36 | 12 | do | 1,220 | Do. |
| 10037 | 37 | 8 | do | 1,358 | 1 strand at the pin. |
| 10038 | 38 | 0 | do | 1,202 | 2 strands at the pin. |
| 10039 | 36 | 4 | do | 1,270 | 1 strand at the pin. |
| 10040 | 36 | 0 | do | 1,362 | 1 strand 3″ from pin. |

## No. 7 Shot Lines.

Three strands of 9 threads each.
Diameter, ".23.
Lay, one turn in ".83.

| No. of test. | Weight of coil. | | End of coil tested. | Tensile strength. | Parted. |
|---|---|---|---|---|---|
| | *Lbs.* | *Oz.* | | *Pounds.* | |
| 10043 | 21 | 9 | Outside..... | 797 | 3 strands at pin. |
| 10044 | 21 | 10 | .....do..... | 769 | 1 strand at the middle. |
| 10045 | 21 | 6 | .....do..... | 799 | 1 strand 8″ from pin. |
| 10046 | 21 | 10 | .....do..... | 779 | 1 strand at the pin. |
| 10047 | 21 | 6 | .....do..... | 775 | Do. |
| 10048 | 21 | 6 | .....do..... | 753 | Do. |
| 10049 | 21 | 8 | .....do..... | 741 | Do. |
| 10050 | 21 | 6 | .....do..... | 770 | 1 strand at the middle. |
| 10051 | 21 | 10 | .....do..... | 765 | 2 strands at the pin. |
| 10052 | 22 | 0 | .....do..... | 796 | 1 strand at the pin. |
| 10053 | 21 | 6 | .....do..... | 794 | Do. |
| 10054 | 21 | 10 | .....do..... | 750 | Do. |
| 10055 | 22 | 0 | .....do..... | 830 | 1 strand 14″ from pin. |
| 10056 | 22 | 0 | .....do..... | 835 | 1 strand at the pin. |
| 10057 | 22 | 1 | .....do..... | 818 | Do. |
| 10058 | 21 | 11. | .....do..... | 720 | 2 strands at the pin. |
| 10059 | 21 | 13 | .....do..... | 778 | 2 strands at the middle. |
| 10060 | 22 | 0 | .....do..... | 784 | 1 strand at the pin. |
| 10061 | 21 | 11 | .....do..... | 788 | 1 strand 20″ from pin. |
| 10062 | 21 | 12 | .....do..... | 746 | 1 strand 12″ from pin. |
| 10063 | 21 | 13 | Inside..... | 804 | 2 strands at the pin. |
| 10064 | 21 | 8 | Outside..... | 791 | 1 strand at the middle. |
| 10065 | 22 | 0 | .....do..... | 787 | 1 strand 17″ from pin. |
| 10066 | 21 | 14 | .....do..... | 823 | 2 strands at the pin. |
| 10067 | 21 | 9 | .....do..... | 746 | 1 strand 12″ from pin. |
| 10068 | 21 | 14 | .....do..... | 814 | 1 strand at the middle. |
| 10069 | 21 | 14 | .....do..... | 805 | 1 strand 24″ from pin. |
| 10070 | 21 | 13 | .....do..... | 779 | 1 strand at the pin. |
| 10071 | 22 | 0 | .....do..... | 774 | 1 strand 18″ from pin. |
| 10072 | 21 | 13 | .....do..... | 801 | 1 strand 5″ from pin. |
| 10073 | 21 | 9 | .....do..... | 837 | 3 strands at the pin. |
| 10074 | 21 | 9 | .....do..... | 809 | 2 strands 8″ from pin. |
| 10075 | 21 | 12 | .....do..... | 750 | 1 strand 12″ from pin. |
| 10076 | 21 | 14 | .....do..... | 798 | 1 strand at the pin. |
| 10077 | 21 | 15 | .....do..... | 802 | 1 strand 24″ from pin. |
| 10078 | 21 | 8 | .....do..... | 802 | 1 strand at the pin. |
| 10079 | 21 | 8 | .....do..... | 790 | Do. |
| 10080 | 21 | 10 | .....do..... | 600 | Do. |
| 10080 *a* | ..... | | .....do..... | 763 | 1 strand 7″ from pin. |
| 10081 | 21 | 12 | .....do..... | 846 | 1 strand 24″ from pin. |
| 10082 | 21 | 13 | .....do..... | 805 | 1 strand 7″ from pin. |
| 10083 | 21 | 12 | .....do..... | 801 | 1 strand at the middle. |
| 10084 | 21 | 9 | .....do..... | 652 | 1 strand at the pin. |
| 10084 *a* | ..... | | .....do..... | 783 | 1 strand 24″ from pin. |
| 10085 | 21 | 13 | .....do..... | 794 | 1 strand at the pin. |
| 10086 | 21 | 11 | .....do..... | 797 | 1 strand 4″ from pin. |
| 10087 | 21 | 8 | Inside..... | 796 | 1 strand at the pin. |
| 10088 | 22 | 0 | Outside..... | 812 | 1 strand 12″ from pin. |
| 10089 | 21 | 8 | .....do..... | 765 | 1 strand 23″ from pin. |
| 10090 | 21 | 15 | .....do..... | 840 | 1 strand at the pin. |
| 10091 | 21 | 12 | .....do..... | 739 | Do. |
| 10092 | 21 | 13 | .....do..... | 853 | Do. |
| 10093 | 22 | 0 | .....do..... | 848 | 2 strands at the pin. |
| 10094 | 21 | 11 | Inside..... | 820 | 1 strand at the pin. |
| 10095 | 21 | 15 | Outside..... | 834 | 3 strands at the pin. |
| 10096 | 21 | 13 | .....do..... | 797 | 1 strand at the pin. |
| 10097 | 21 | 10 | .....do..... | 838 | Do. |
| 10098 | 22 | 0 | .....do..... | 791 | Do. |
| 10099 | 21 | 11 | .....do..... | 847 | Do. |
| 10100 | 21 | 13 | .....do..... | 764 | 1 strand 14″ from pin. |
| 10101 | 21 | 12 | .....do..... | 797 | 1 strand at the middle. |
| 10102 | 22 | 0 | .....do..... | 805 | 1 strand at the pin. |
| 10103 | 21 | 13 | .....do..... | 832 | 2 strands at the pin. |
| 10104 | 21 | 10 | .....do..... | 798 | 1 strand at the pin. |
| 10105 | 21 | 11 | .....do..... | 810 | 1 strand 9″ from pin. |
| 10106 | 21 | 14 | .....do..... | 789 | 1 strand at the middle. |
| 10107 | 21 | 15 | .....do..... | 812 | 1 strand at the pin. |
| 10108 | 21 | 14 | .....do..... | 799 | 1 strand 7″ from pin. |
| 10109 | 21 | 15 | .....do..... | 851 | 1 strand 10″ from pin. |
| 10110 | 21 | 7 | .....do..... | 803 | 1 strand at the pin. |
| 10111 | 21 | 15 | .....do..... | 740 | Do. |
| 10112 | 21 | 5 | Inside..... | 796 | Do. |

## No. 7 Shot Lines—Continued.

| No. of test. | Weight of coil. | | End of coil tested. | Tensile strength. | Parted. |
|---|---|---|---|---|---|
| | *Lbs.* | *Oz.* | | *Pounds.* | |
| 10113 | 21 | 14 | Outside..... | 849 | 2 strands at the pin. |
| 10114 | 22 | 1 | Inside ..... | 798 | 1 strand at the pin. |
| 10115 | 21 | 8 | Outside..... | 762 | 1 strand 18″ from pin. |
| 10116 | 22 | 2 | .....do ..... | 802 | 1 strand at the pin. |
| 10117 | 22 | 0 | Inside ..... | 820 | 2 strands at the pin. |
| 10118 | 21 | 8 | Outside..... | 795 | 1 strand 4″ from pin. |
| 10119 | 22 | 0 | Inside ..... | 796 | 1 strand at the pin. |
| 10120 | 22 | 0 | Outside..... | 810 | Do. |
| 10121 | 21 | 12 | .....do ..... | 821 | 1 strand 12″ from pin. |
| 10122 | 21 | 10 | Inside ..... | 841 | 1 strand 8″ from pin. |
| 10123 | 22 | 0 | Outside..... | 799 | 1 strand at the pin. |
| 10124 | 22 | 0 | .....do ..... | 795 | Do. |
| 10125 | 21 | 10 | .....do ..... | 792 | 2 strands at the pin. |
| 10126 | 21 | 8 | .....do ..... | 801 | 1 strand 5″ from pin. |
| 10127 | 21 | 14 | .....do ..... | 812 | 1 strand at the middle. |
| 10128 | 21 | 7 | Inside ..... | 841 | Do. |
| 10129 | 22 | 0 | Outside..... | 798 | 1 strand 17″ from pin. |
| 10130 | 21 | 15 | .....do ..... | 786 | 2 strands at the pin. |
| 10131 | 21 | 13 | .....do ..... | 830 | 1 strand at the middle. |
| 10132 | 21 | 8 | .....do ..... | 737 | 1 strand at the pin. |
| 10133 | 21 | 8 | .....do ..... | 785 | 1 strand 22″ from pin. |
| 10134 | 21 | 12 | Inside ..... | 882 | 1 strand 12″ from pin. |
| 10135 | 21 | 12 | Outside..... | 838 | 1 strand 14″ from pin. |
| 10136 | 22 | 2 | .....do ..... | 797 | 1 strand at the pin. |
| 10137 | 21 | 15 | .....do ..... | 820 | Do. |
| 10138 | 22 | 0 | .....do ..... | 767 | 1 strand 24″ from pin. |
| 10139 | 21 | 14 | .....do ..... | 798 | 1 strand 12″ from pin. |
| 10140 | 21 | 13 | .....do ..... | 788 | 2 strands 12″ from pin. |
| 10141 | 21 | 10 | .....do ..... | 843 | 1 strand at the pin. |
| 10142 | 21 | 8 | .....do ..... | 783 | 1 strand at the middle. |

## No. 4 Shot Lines.

Three strands of 4 threads each.
Diameter, ".15.
Lay, one turn in ".66.

| No. of test. | Weight of coil. | | End of coil tested. | Tensile strength. | Parted. |
|---|---|---|---|---|---|
| | *Lbs.* | *Oz.* | | *Pounds.* | |
| 10145 | 10 | 7 | Outside..... | 385 | 1 strand at the middle. |
| 10146 | 10 | 7 | .....do ..... | 449 | 3 strands 18" from pin. |
| 10147 | 10 | 6 | Inside ..... | 369 | 3 strands 22" from pin. |
| 10148 | 10 | 6 | Outside..... | 397 | 1 strand at the middle. |
| 10149 | 10 | 7 | .....do ..... | 405 | 3 strands at the middle. |
| 10150 | 10 | 9 | .....do ..... | 415 | 1 strand at the pin. |
| 10151 | 10 | 6 | Inside ..... | 402 | 1 strand 17" from pin. |
| 10152 | 10 | 6 | Outside..... | 405 | 1 strand at the middle. |
| 10153 | 10 | 8 | .....do ..... | 436 | 2 strands 18" from pin. |
| 10154 | 10 | 8 | .....do ..... | 415 | 3 strands 3" from pin. |
| 10155 | 10 | 7 | .....do ..... | 406 | 2 strands at the middle. |
| 10156 | 10 | 6 | Inside ..... | 389 | 1 strand at the middle. |
| 10157 | 10 | 8 | Outside..... ..... | 405 | 1 strand 24" from pin. |
| 10158 | 10 | 9 | .....do ..... | 402 | 3 strands 4" from pin. |
| 10159 | 10 | 7 | Inside ..... | 391 | 3 strands at the middle. |
| 10160 | 10 | 7 | Outside..... | 412 | 1 strand 17" from pin. |
| 10161 | 10 | 7 | .....do ..... | 449 | 3 strands 22" from pin. |
| 10162 | 10 | 9 | .....do ..... | 414 | 1 strand 18" from pin. |
| 10163 | 10 | 7 | .....do ..... | 424 | 1 strand 14" from pin. |
| 10164 | 10 | 12 | .....do ..... | 445 | 3 strands 9" from pin. |
| 10165 | 10 | 11 | .....do ..... | 400 | 2 strands 18" from pin. |
| 10166 | 10 | 12 | .....do ..... | 404 | 3 strands 15" from pin. |
| 10167 | 10 | 10 | .....do ..... | 488 | 1 strand 11" from pin. |
| 10168 | 10 | 8 | .....do ..... | 449 | 3 strands at the middle. |
| 10169 | 10 | 5 | Inside ..... | 424 | 3 strands 13" from pin. |
| 10170 | 10 | 8 | Outside..... | 438 | 3 strands at the middle. |
| 10171 | 10 | 7 | Inside ..... | 380 | 1 strand 16" from pin. |
| 10172 | 10 | 8 | Outside..... | 430 | 3 strands at the middle. |
| 10173 | 10 | 6 | .....do ..... | 446 | 2 strands 15" from pin. |
| 10174 | 10 | 5 | .....do ..... | 403 | 1 strand 10" from pin. |
| 10175 | 10 | 5 | .....do ..... | 394 | 2 strands at the middle. |
| 10176 | 10 | 7 | .....do ..... | 396 | 1 strand at the middle. |
| 10177 | 10 | 6 | .....do ..... | 435 | Do. |
| 10178 | 10 | 11 | .....do ..... | 376 | 1 strand 22" from pin. |
| 10179 | 10 | 6 | .....do ..... | 440 | 1 strand 24" from pin. |
| 10180 | 10 | 10 | Inside ..... | 443 | 3 strands 6" from pin. |
| 10181 | 10 | 8 | .....do ..... | 398 | 1 strand 18" from pin. |
| 10182 | 10 | 5 | Outside..... | 423 | 1 strand 14" from pin. |
| 10183 | 10 | 9 | .....do ..... | 401 | 3 strands 2" from pin. |
| 10184 | 10 | 13 | .....do ..... | 447 | 2 strands 18" from pin. |
| 10185 | 10 | 13 | .....do ..... | 400 | 2 strands 20" from pin. |
| 10186 | 10 | 10 | .....do ..... | 436 | 2 strands 18" from pin. |
| 10187 | 10 | 10 | .....do ..... | 418 | 2 strands at the pin. |
| 10188 | 10 | 11 | .....do ..... | 404 | 3 strands 14" from pin. |
| 10189 | 10 | 8 | .....do ..... | 445 | 2 strands 12" from pin. |
| 10190 | 10 | 8 | .....do ..... | 395 | 1 strand 4" from pin. |
| 10191 | 10 | 8 | .....do ..... | 435 | 3 strands at the pin. |
| 10192 | 10 | 11 | .....do ..... | 389 | Do. |
| 10193 | 10 | 8 | .....do ..... | 443 | Do. |
| 10194 | 10 | 8 | .....do ..... | 421 | 2 strands 14" from pin. |
| 10195 | 10 | 11 | .....do ..... | 441 | Do. |
| 10196 | 10 | 10 | .....do ..... | 394 | 1 strand 13" from pin. |
| 10197 | 10 | 10 | .....do ..... | 386 | 3 strands at the pin. |
| 10198 | 10 | 12 | .....do ..... | 429 | 3 strands 3" from pin. |
| 10199 | 10 | 10 | .....do ..... | 412 | 1 strand 15" from pin. |
| 10200 | 10 | 8 | .....do ..... | 447 | 3 strands at the pin. |
| 10201 | 10 | 12 | .....do ..... | 455 | Do. |
| 10202 | 10 | 7 | .....do ..... | 397 | 2 strands at the middle. |
| 10203 | 10 | 7 | .....do ..... | 447 | 1 strand 7" from pin. |
| 10204 | 10 | 10 | .....do ..... | 439 | 3 strands at the pin. |
| 10205 | 10 | 6 | .....do ..... | 378 | Do. |
| 10206 | 10 | 8 | .....do ..... | 419 | 3 strands at the middle. |
| 10207 | 10 | 6 | .....do ..... | 439 | 2 strands 3" from pin. |
| 10208 | 10 | 6 | .....do ..... | 439 | 3 strands 12" from pin. |
| 10209 | 10 | 10 | .....do ..... | 427 | 2 strands 22" from pin. |
| 10210 | 10 | 10 | .....do ..... | 466 | 3 strands 12" from pin. |
| 10211 | 10 | 8 | .....do ..... | 442 | 2 strands 7" from pin. |
| 10212 | 10 | 8 | .....do ..... | 410 | 3 strands at the pin. |
| 10213 | 10 | 8 | .....do ..... | 398 | Do. |
| 10214 | 10 | 9 | .....do ..... | 406 | 2 strands at the middle. |
| 10215 | 10 | 11 | Inside ..... | 387 | 1 strand 14" from pin. |
| 10216 | 10 | 10 | Outside..... | 449 | 2 strands at the middle. |

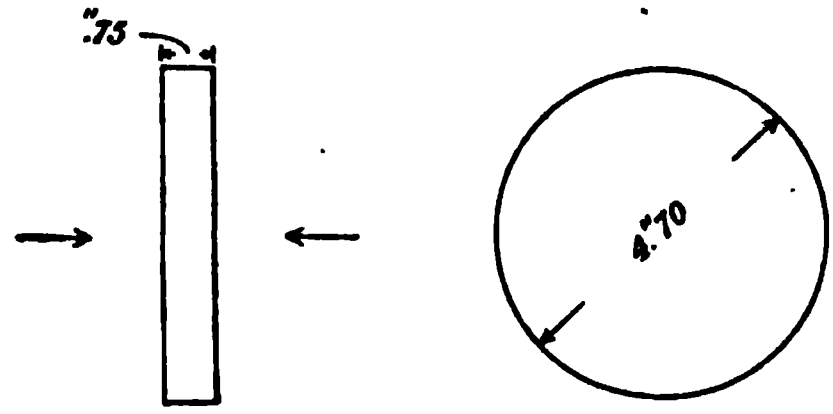
## No. 4 Shot Lines—Continued.

| No. of test. | Weight of coil. | | End of coil tested. | Tensile strength. | Parted. |
|---|---|---|---|---|---|
| | *Lbs.* | *Oz.* | | *Pounds.* | |
| 10217 | 10 | 7 | Outside | 383 | 3 strands at the pin. |
| 10218 | 10 | 10 | .....do | 438 | 1 strand 14″ from pin. |
| 10219 | 10 | 6 | .....do | 432 | 3 strands 8″ from pin. |
| 10220 | 10 | 9 | .....do | 378 | 1 strand 3″ from pin. |
| 10221 | 10 | 12 | .....do | 397 | 3 strands at the middle. |
| 10222 | 10 | 11 | .....do | 451 | 1 strand at the middle. |
| 10223 | 10 | 12 | .....do | 410 | 1 strand 24″ from pin. |
| 10224 | 10 | 9 | .....do | 412 | 1 strand 12″ from pin. |
| 10225 | 10 | 9 | .....do | 436 | 3 strands 18″ from pin. |
| 10226 | 10 | 10 | .....do | 436 | 2 strands 6″ from pin. |
| 10227 | 10 | 10 | .....do | 452 | 1 strand 18″ from pin. |
| 10228 | 10 | 10 | .....do | 397 | 1 strand 6″ from pin. |
| 10229 | 10 | 10 | .....do | 406 | 2 strands at the middle. |
| 10230 | 10 | 9 | .....do | 397 | 2 strands 8″ from pin. |
| 10231 | 10 | 11 | .....do | 397 | 2 strands 6″ from pin. |
| 10232 | 10 | 8 | .....do | 392 | 3 strands 24″ from pin. |
| 10233 | 10 | 6 | .....do | 401 | 1 strand 10″ from pin. |
| 10234 | 10 | 9 | Inside | 402 | 2 strands 19″ from pin. |
| 10235 | 10 | 9 | .....do | 402 | 2 strands 3″ from pin. |
| 10236 | 10 | 8 | Outside | 386 | 3 strands 12″ from pin. |
| 10237 | 10 | 8 | .....do | 452 | 3 strands 19″ from pin. |
| 10238 | 10 | 6 | .....do | 387 | 2 strands 15″ from pin. |
| 10239 | 10 | 6 | .....do | 426 | 3 strands at the pin. |
| 10240 | 10 | 6 | .....do | 442 | 2 strands 10″ from pin. |
| 10241 | 10 | 10 | .....do | 437 | 1 strand 18″ from pin. |
| 10242 | 10 | 10 | .....do | 417 | 3 strands 8″ from pin. |
| 10243 | 10 | 7 | Inside | 401 | 1 strand 18″ from pin. |
| 10244 | 10 | 10 | .....do | 395 | 3 strands 15″ from pin. |

# COMPRESSION OF RUBBER, BALATA, AND WOOD BUFFERS.

## No. 9874.

**Balata furnished by the Omo Manufacturing Company.**

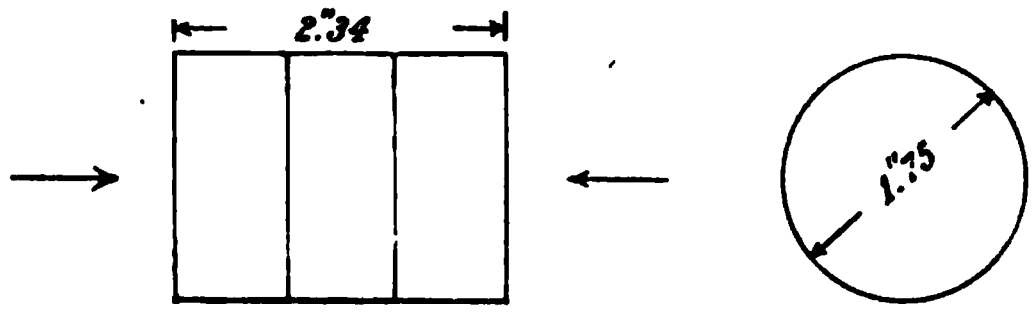



| Applied loads. | | Compression. | Remarks. |
|---|---|---|---|
| Total. | Per square inch. | | |
| *Pounds.* | *Pounds.* | *Inch.* | |
| 2,000 | ..... | 0. | Initial load. |
| 10,000 | ..... | .04 | |
| 20,000 | ..... | .22 | |
| 2,000 | ..... | .17 | |
| 30,000 | ..... | .29 | |
| 30,000 | ..... | .30 | After 6 minutes' rest. |
| 2,000 | ..... | .26 | |
| 2,000 | ..... | .25 | After 2 minutes' rest. |
| 40,000 | ..... | .35 | |
| 50,000 | ..... | .39 | |
| 2,000 | ..... | .34 | |
| 2,000 | ..... | .33 | After 2 minutes' rest. |

Final diameter, 7".6, load removed..

## No. 9904.

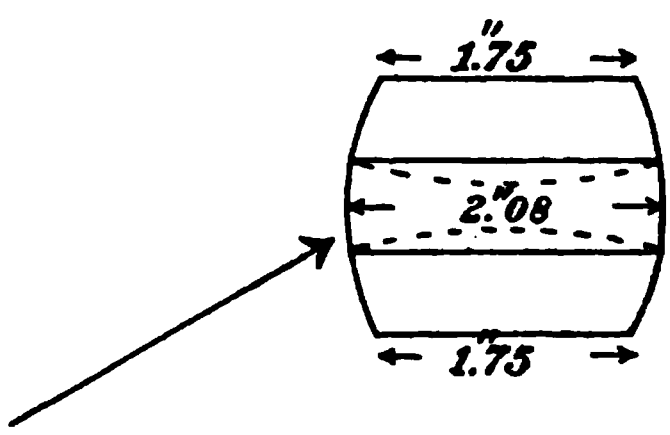
Combined balata and india-rubber spring furnished by the Newton Rubber Company, for 12-inch disappearing gun carriages, March, 1900.




Three thicknesses of spring.
Sectional area, 2.4 square inches.

| Applied loads. | | Compression of spring. | Remarks. |
|---|---|---|---|
| Total. | Per square inch. | | |
| *Pounds.* | *Pounds.* | *Inches.* | |
| 24 | 10 | 0. | Initial load. |
| 48 | 20 | .004 | |
| 96 | 40 | .015 | |
| 144 | 60 | .026 | |
| 192 | 80 | .037 | |
| 240 | 100 | .052 | |
| 24 | 10 | .005 | |
| 336 | 140 | .079 | |
| 432 | 180 | .118 | |
| 480 | 200 | .140 | |
| 24 | 10 | .026 | |
| 576 | 240 | .190 | |
| 672 | 280 | .254 | |
| 720 | 300 | .276 | |
| 24 | 10 | .064 | |
| 960 | 400 | .471 | |
| 24 | 10 | .119 | |
| 1,200 | 500 | .668 | |
| 24 | 10 | .199 | |
| 1,440 | 600 | .847 | |
| 24 | 10 | .806 | |
| 1,680 | 700 | 1.040 | |
| 24 | 10 | .409 | |
| 1,920 | 800 | 1.160 | |
| 24 | 10 | .486 | |
| 2,160 | 900 | 1.250 | |
| 24 | 10 | .561 | |
| 2,400 | 1,000 | 1.320 | |
| 24 | 10 | .629 | |

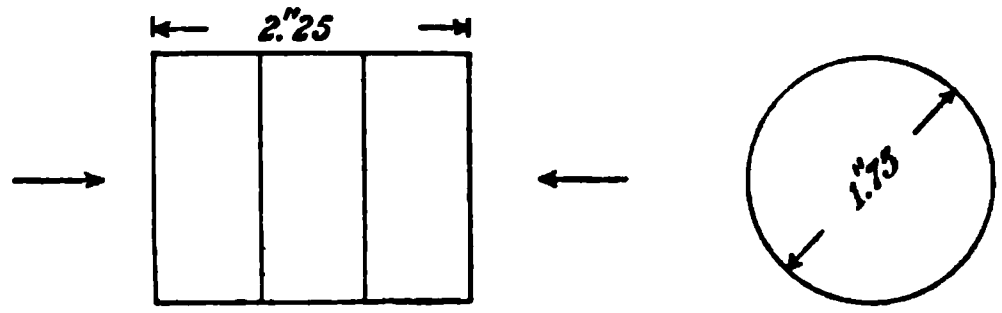
SHAPE AFTER THE TEST.




Middle piece concave ".12 and ".15 on the two ends, respectively.

## No. 9905.

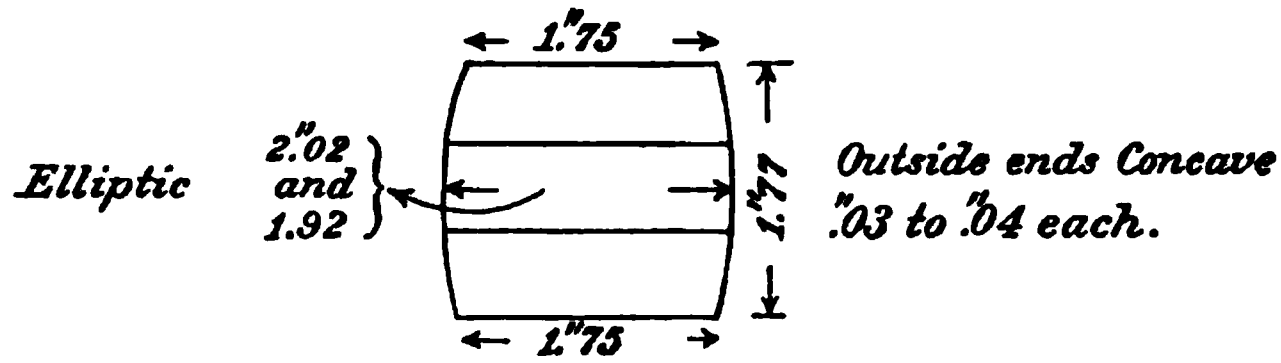
**Balata furnished by the Omo Manufacturing Company.**




Three thicknesses of balata.
Sectional area, 2.4 square inches.

| Applied loads. | | Compression of spring. | Remarks. |
|---|---|---|---|
| Total. | Per square inch. | | |
| *Pounds.* | *Pounds.* | *Inches.* | |
| 24 | 10 | 0. | Initial load. |
| 48 | 20 | .008 | |
| 24 | 10 | .003 | |
| 96 | 40 | .016 | |
| 144 | 60 | .021 | |
| 192 | 80 | .025 | |
| 240 | 100 | .029 | |
| 24 | 10 | .005 | |
| 336 | 140 | .037 | |
| 432 | 180 | .043 | |
| 480 | 200 | .048 | |
| 24 | 10 | .009 | |
| 576 | 240 | .058 | |
| 672 | 280 | .068 | |
| 720 | 300 | .073 | |
| 24 | 10 | .012 | |
| 960 | 400 | .102 | |
| 24 | 10 | .021 | |
| 1,200 | 500 | .170 | |
| 24 | 10 | .039 | |
| 1,440 | 600 | .259 | |
| 24 | 10 | .066 | |
| 1,680 | 700 | .356 | |
| 24 | 10 | .099 | |
| 1,920 | 800 | .453 | |
| 24 | 10 | .141 | |
| 2,160 | 900 | .522 | |
| 24 | 10 | .179 | |
| 2,400 | 1,000 | .599 | |
| 24 | 10 | .215 | |
| 2,880 | 1,200 | .765 | |
| 24 | 10 | .312 | |
| 3,360 | 1,400 | .902 | |
| 24 | 10 | .478 | |

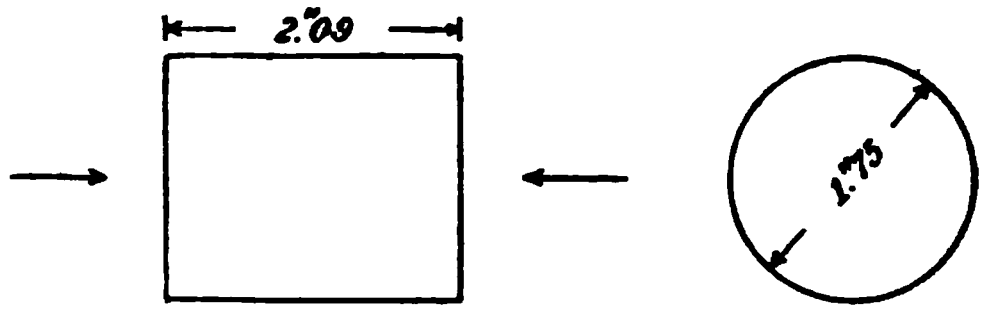
SHAPE AFTER THE TEST.



No. 9906.

Test of rubber after an interval of rest of 7 years 5 months after manufacture.

Rubber with 2 ounces of sulphur per pound.

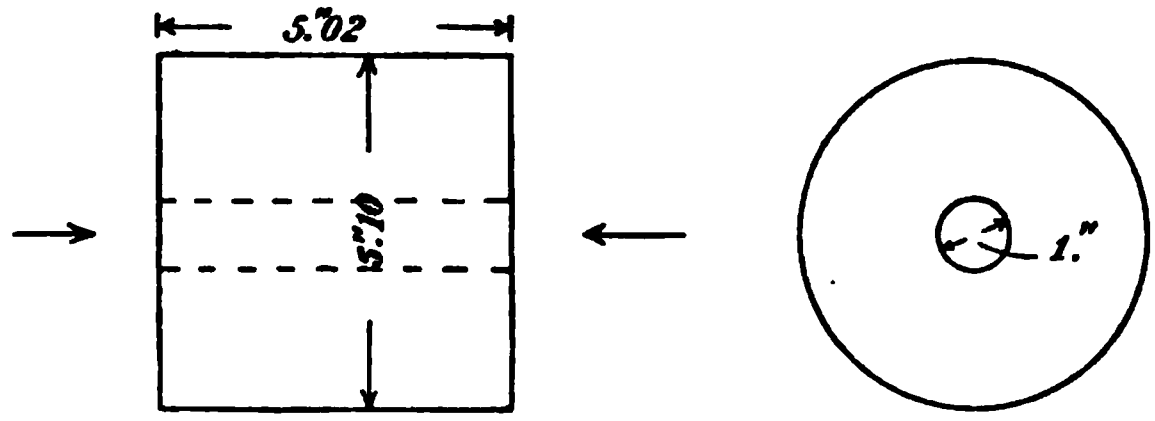



Sectional area, 2.4 square inches.

| Applied loads. | | Compression of spring. | Remarks. |
|---|---|---|---|
| Total. | Per square inch. | | |
| *Pounds.* | *Pounds.* | *Inches.* | |
| 24 | 10 | 0. | Initial load. |
| 48 | 20 | .073 | |
| 96 | 40 | .211 | |
| 144 | 60 | .344 | |
| 192 | 80 | .453 | |
| 240 | 100 | .548 | |
| 24 | 10 | 0. | |
| 336 | 140 | .705 | |
| 432 | 180 | .843 | |
| 480 | 200 | .900 | |
| 24 | 10 | 0. | |

## No. 9907.

Old rubber spring from an 8″ barbette carriage from Fort Rodman, New Bedford, Mass.

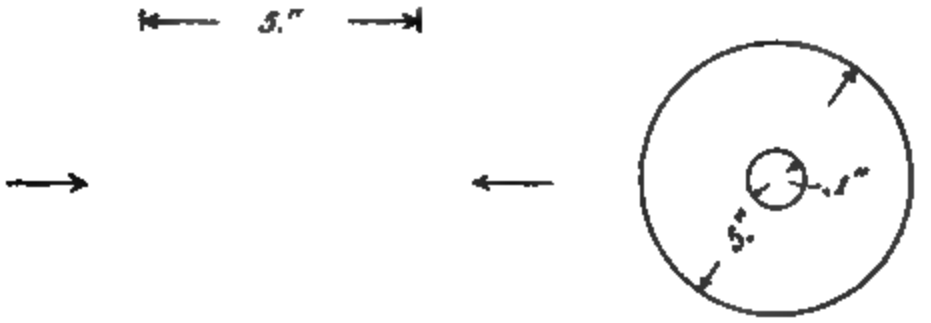



Weight, 6 pounds 5½ ounces.
Sectional area, 19.64 square inches.
One end of spring was pitted where in contact with rusty iron.

| Applied loads. | | Compression of spring. | Remarks. |
|---|---|---|---|
| Total. | Per square inch. | | |
| *Pounds.* | *Pounds.* | *Inches.* | |
| 196 | 10 | 0. | Initial load. |
| 393 | 20 | .080 | |
| 785 | 40 | .192 | |
| 1,178 | 60 | .294 | |
| 1,571 | 80 | .412 | |
| 1,964 | 100 | .532 | |
| 196 | 10 | .014 | |
| 2,749 | 140 | .789 | |
| 3,535 | 180 | 1.010 | |
| 3,928 | 200 | 1.130 | |
| 196 | 10 | .049 | |
| 4,713 | 240 | 1.340 | |
| 5,498 | 280 | 1.500 | |
| 5,892 | 300 | 1.590 | |
| 196 | 10 | .061 | |
| 7,856 | 400 | 1.950 | |
| 196 | 10 | .064 | |
| 9,820 | 500 | 2.210 | |
| 196 | 10 | .085 | |
| 11,784 | 600 | 2.400 | |
| 196 | 10 | .098 | |
| 13,748 | 700 | 2.570 | Cracks in surface extend. |
| 196 | 10 | .120 | |
| 15,712 | 800 | 2.680 | |
| 196 | 10 | .142 | |
| 17,676 | 900 | 2.770 | |
| 196 | 10 | .151 | |
| 19,640 | 1,000 | 2.850 | |
| 196 | 10 | .155 | |

No. 9908.

## Compression of Spruce Wood.



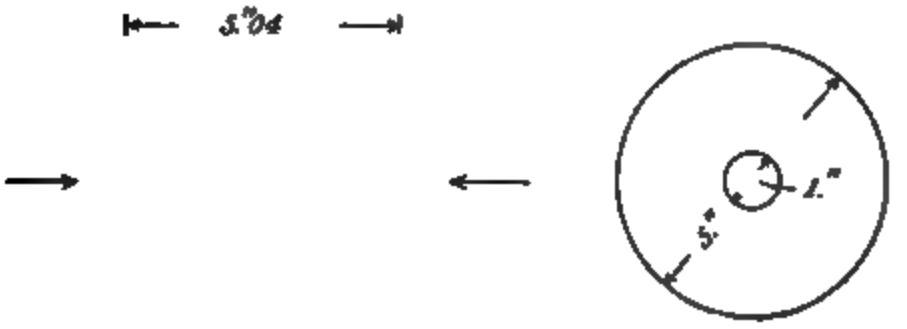

Each layer of wood has the grain crossing the next layer at right angles.

Sectional area 18.85 square inches.

| Applied loads. | | Compression. | Remarks. |
|---|---|---|---|
| Total | Per square inch. | | |
| *Pounds.* | *Pounds.* | *Inches* | |
| 188 | 10 | .0 | Initial load. |
| 377 | 20 | 002 | |
| 754 | 40 | .005 | |
| 1,131 | 60 | 007 | |
| 1,509 | 80 | .010 | |
| 1,885 | 100 | .011 | |
| 188 | 10 | .001 | |
| 2,639 | 140 | .015 | |
| 3,393 | 180 | .020 | |
| 3,770 | 200 | .021 | |
| 189 | 10 | .002 | |
| 4,524 | 240 | 025 | |
| 5,278 | 280 | .027 | |
| 5,655 | 300 | .030 | |
| 188 | 10 | .003 | |
| 7,540 | 400 | .040 | |
| 188 | 10 | .004 | |
| 9,425 | 500 | .054 | |
| 188 | 10 | 007 | |
| 11,310 | 600 | .079 | |
| 188 | 10 | .014 | |
| 12,195 | 700 | .140 | |
| 188 | 10 | .043 | |
| 15,080 | 800 | 1.020 | |

## No. 9909.

## Compression of Oak Wood.



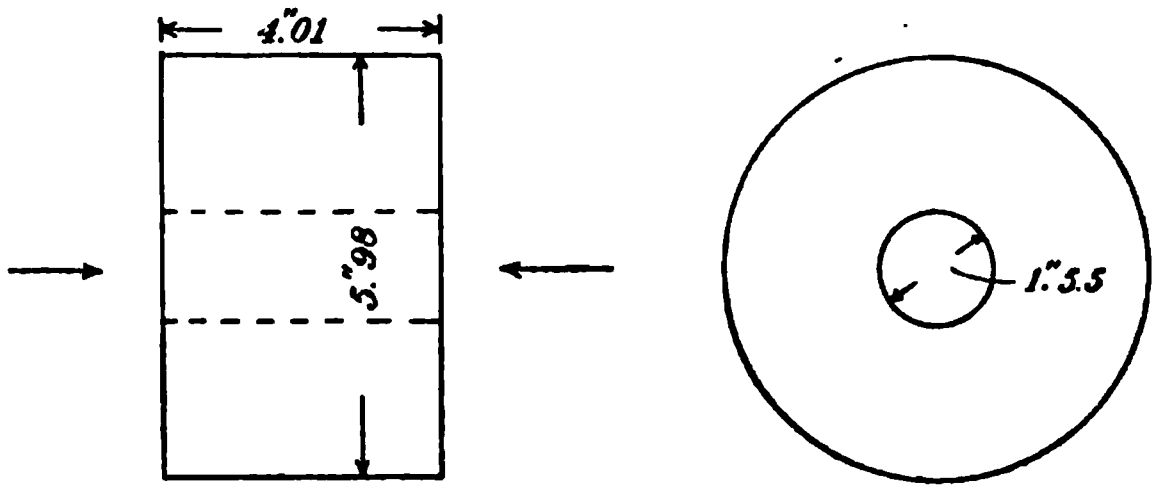

Each layer of wood has the grain crossing the next layer at right angles.

Sectional area, 18.85 square inches.

| Applied loads. | | Compression. | Remarks. |
|---|---|---|---|
| Total | Per square inch. | | |
| *Pounds.* | *Pounds.* | *Inch.* | |
| 188 | 10 | 0. | Initial load. |
| 1,185 | 100 | .005 | |
| 188 | 10 | .001 | |
| 3,770 | 200 | .010 | |
| 188 | 10 | .002 | |
| 5,656 | 300 | .015 | |
| 188 | 10 | .003 | |
| 7,540 | 400 | .018 | |
| 188 | 10 | .003 | |
| 9,425 | 500 | .021 | |
| 188 | 10 | .003 | |
| 11,310 | 600 | .024 | |
| 188 | 10 | .004 | |
| 12,195 | 700 | .027 | |
| 188 | 10 | .004 | |
| 15,080 | 800 | .030 | |
| 188 | 10 | .004 | |
| 16,965 | 900 | .034 | |
| 188 | 10 | .005 | |
| 18,850 | 1,000 | .038 | |
| 188 | 10 | .006 | |
| 22,620 | 1,200 | .047 | |
| 188 | 10 | .008 | |
| 24,390 | 1,400 | .055 | |
| 188 | 10 | .011 | |
| 30,160 | 1,600 | .096 | |
| 188 | 10 | .029 | |
| 33,930 | 1,800 | .277 | |
| 188 | 10 | .147 | |
| 37,700 | 2,000 | 950 | |
| 188 | 10 | 675 | |

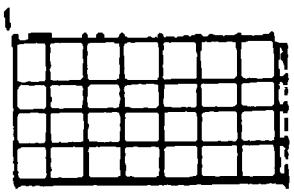
## No. 9910.

New rubber spring furnished by the Newton Rubber Company.




Weight, 7 pounds 1¼ ounces.
Sectional area, 26.2 square inches.

| Applied loads. | | Compression of spring. | Remarks. |
|---|---|---|---|
| Total. | Per square inch. | | |
| *Pounds.* | *Pounds.* | *Inches.* | |
| 262 | 10 | 0. | Initial load. |
| 524 | 20 | .030 | |
| 1,048 | 40 | .122 | |
| 1,572 | 60 | .198 | |
| 2,096 | 80 | .275 | |
| 2,620 | 100 | .352 | |
| 262 | 10 | .015 | |
| 3,668 | 140 | .507 | |
| 4,716 | 180 | .663 | |
| 5,240 | 200 | .739 | |
| 262 | 10 | .025 | |
| 6,288 | 240 | .876 | |
| 7,336 | 280 | 1.010 | |
| 7,860 | 300 | 1.070 | |
| 262 | 10 | .041 | |
| 8,908 | 340 | 1.230 | |
| 9,956 | 380 | 1.850 | |
| 10,480 | 400 | 1.390 | |
| 262 | 10 | .063 | |
| 13,100 | 500 | 1.620 | |
| 262 | 10 | .070 | |



# CHEMICAL ANALYSES.

## STEELS FROM SPRINGFIELD ARMORY.

| No. of tension test. | Description. | Marks. | Carbon. | Manganese. | Silicon. | Sulphur. | Phosphorus. | Copper. | Nickel. | Tungsten. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6494 | Rifle barrel steel | S 6 | 0.561 | 1.200 | 0.298 | 0.055 | 0.027 | ..... | ..... | ..... | |
| 6495 | .....do | S B | 0.565 | 1.231 | 0.300 | 0.050 | 0.025 | ..... | ..... | ..... | |
| 6550 | .....do | S 6 | 0.490 | 1.070 | 0.365 | 0.051 | 0.057 | ..... | ..... | ..... | |
| 6551 | .....do | S 6 R | 0.494 | 1.070 | 0.374 | 0.047 | 0.055 | ..... | ..... | ..... | |
| 6562 | .....do | 6 S | 0.636 | 1.166 | 0.312 | 0.030 | 0.058 | ..... | ..... | ..... | |
| 6607 | .....do | H | 0.511 | 0.968 | 0.254 | 0.045 | 0.028 | 0.060 | 1.601 | ..... | |
| 6786 | .....do | S 15 R B | 0.490 | 1.210 | 0.434 | 0.062 | 0.065 | ..... | ..... | ..... | |
| 6788 | .....do | S 15 R A B | 0.530 | 1.190 | 0.309 | 0.060 | 0.070 | ..... | ..... | ..... | |
| 6705 | .....do | L R B | 0.510 | 1.155 | 0.219 | 0.045 | 0.080 | ..... | ..... | ..... | |
| 6847 | .....do | ..... | 0.500 | 0.826 | 0.204 | 0.032 | 0.020 | 0.040 | 0.000 | ..... | |
| 6851 | .....do | S 18 | 0.440 | 1.230 | 0.270 | 0.030 | 0.062 | ..... | ..... | ..... | |
| 6871 | .....do | S 20 | 0.486 | 1.300 | 0.265 | 0.090 | 0.074 | ..... | ..... | ..... | |
| 6895 | .....do | S 17 R | 0.530 | 1.200 | 0.235 | 0.090 | 0.078 | ..... | ..... | ..... | |
| 6896 | .....do | S 17 R A | 0.550 | 1.215 | 0.239 | 0.087 | 0.075 | ..... | ..... | ..... | |
| | .....do | S 26 . | 0.540 | 1.120 | 0.168 | 0.045 | 0.044 | ..... | ..... | ..... | |
| | .....do | S 26 . . | 0.546 | 1.105 | 0.172 | 0.050 | 0.044 | ..... | ..... | ..... | |
| | .....do | S 26 . . . | 0.568 | 1.072 | 0.161 | 0.041 | 0.048 | ..... | ..... | ..... | |
| 6872 | .....do | N S | 0.300 | 0.774 | 0.326 | 0.037 | 0.026 | 0.007 | 4.000 | ..... | |
| 6524 | Receiver steel | 2 R R | 0.371 | 0.654 | 0.075 | 0.055 | 0.065 | ..... | ..... | ..... | |
| 6525 | .....do | 3 R R | 0.360 | 0.630 | 0.070 | 0.060 | 0.068 | ..... | ..... | ..... | |
| | .....do | C | 0.330 | 0.603 | 0.028 | 0.030 | 0.015 | 0.020 | ..... | ..... | Service received. |
| 6897 | .....do | R R 5 | 0.310 | 0.550 | 0.090 | 0.072 | 0.078 | ..... | ..... | ..... | |
| | .....do | End A | 0.138 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | Chips taken from finished receivers after tests by tension. The thin parts are represented by the middle samples, the thicker parts by the end samples. Metal annealed before taking out chips. |
| | .....do | Middle A | 0.132 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| | .....do | End B | 0.334 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| | .....do | Middle B | 0.334 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| | .....do | End C | 0.310 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| | .....do | Middle C | 0.315 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| | .....do | End D | 0.318 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| | .....do | Middle D | 0.360 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| 6813 | Bolt steel | ..... | 0.772 | 0.480 | 0.011 | 0.040 | 0.055 | ..... | ..... | ..... | |
| | .....do | S J B | 0.550 | 0.300 | 0.169 | 0.030 | 0.016 | ..... | ..... | ..... | Broken bolt. |
| | .....do | ..... | 0.750 | 0.450 | 0.250 | 0.025 | 0.017 | ..... | ..... | ..... | |
| | .....do | ..... | 0.610 | 0.420 | 0.080 | 0.057 | 0.010 | ..... | ..... | ..... | |
| | .....do | ..... | 0.630 | 0.892 | 0.158 | 0.040 | 0.020 | ..... | ..... | ..... | |
| | .....do | ..... | 0.750 | 0.420 | 0.100 | 0.030 | 0.025 | ..... | ..... | ..... | |
| | .....do | ..... | 0.650 | 0.358 | 0.145 | 0.040 | 0.024 | ..... | ..... | ..... | |
| | .....do | C | 1.140 | 0.407 | 0.160 | 0.006 | 0.004 | ..... | ..... | 1.000 | |
| 6899 | Gatling gun steel | G G C | 0.475 | 1.290 | 0.168 | 0.085 | 0.070 | 0.010 | ..... | ..... | |

## MISCELLANEOUS STEELS.

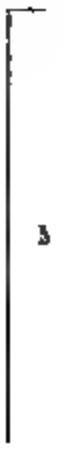
| No. of tension test. | Description. | Marks. | Carbon. | Manganese. | Silicon. | Sulphur. | Phosphorus. | Copper. | Nickel. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| 6511 | Jacket, 7″ howitzer | 7 H 23 J K $T_1$ O | 0.500 | 0.710 | 0.227 | 0.020 | 0.020 | ..... | ..... | |
| 6501 | .....do | 14816 $B_2$ $F_1$, B $T_2$ N | .563 | .663 | .127 | .020 | .020 | ..... | ..... | |
| 6512 | Jacket, 5″ siege gun | 13169 $B_4$ B $T_2$ N | .509 | .699 | .141 | .025 | .021 | ..... | ..... | |
| | Shrapnel steel | A | .530 | .350 | .014 | .024 | .010 | ..... | ..... | |
| | .....do | B | .120 | .362 | .010 | .027 | .011 | ..... | ..... | |
| 6532 | Pivot-socket, 15-pounder mount | A 30 3 P S 15 | .316 | .581 | .195 | .057 | .048 | ..... | ..... | Cast steel. |
| 6549 | .....do | A 63 P S 15 | .190 | .423 | .153 | .075 | .050 | ..... | ..... | Do. |
| 6862 | .....do | A 93 P S 15 | .450 | .413 | .158 | .065 | .044 | ..... | ..... | Do. |
| 6868 | Pivot-yoke, 15-pounder mount | S 15 P Y 15 | .490 | .480 | .282 | .073 | .038 | ..... | ..... | Do. |
| 6905 | .....do | S 24 P Y 15 | .425 | .470 | .300 | .058 | .039 | ..... | ..... | Do. |
| 6906 | .....do | S 25 P Y 15 | .500 | .464 | .260 | .056 | .041 | ..... | ..... | Do. |
| 6914 | .....do | S 26 P Y 15 | .430 | .370 | .340 | .055 | .032 | ..... | ..... | Do. |
| 6922 | Inner base, 15-pounder mount | A 39 2 I B 15 | .400 | .330 | .170 | .056 | .047 | ..... | ..... | Do. |
| 6913 | .....do | A 63 I B 15 | .350 | .400 | .316 | .060 | .036 | ..... | ..... | Do. |
| 9781 | Piston-rod, engine 134 | 134 | .390 | .440 | .030 | .053 | .044 | ..... | 0.000 | |
| 9782 | Driving axle, engine 923–8 | 923–8 | .440 | .535 | .280 | .036 | .040 | ..... | .000 | |
| 9783 | Driving axle, engine 923–9 | 923–9 | .430 | .540 | .272 | .036 | .039 | ..... | .000 | |
| 9784 | Driving axle, engine 283–8 | 283–8 | .431 | .580 | .191 | .040 | .030 | ..... | .000 | |
| 9785 | Driving axle, engine 283–9 | 283–9 | .425 | .600 | .202 | .043 | .035 | ..... | .000 | |
| 9786 | Driving axle, engine 1428–8 | 1428–8 | .419 | .285 | .018 | .027 | .006 | ..... | .000 | |
| 9787 | Driving axle, engine 1428–9 | 1428–9 | .420 | .295 | .019 | .029 | .005 | ..... | .000 | |
| 9788 | Nickel steel piston-rod | A | .245 | .340 | .047 | .039 | .055 | ..... | 2.700 | |
| 9789 | .....do | B | .200 | .240 | .045 | .037 | .032 | ..... | 2.290 | |
| 9790 | .....do | C | .324 | .200 | .038 | .040 | .037 | ..... | 1.890 | |
| 9791 | .....do | D | .250 | .370 | .048 | .040 | .048 | ..... | 1.700 | |
| 9792 | .....do | E | .309 | .200 | .043 | .042 | .043 | ..... | 1.345 | |
| 9793 | .....do | F | .334 | .562 | .335 | .045 | .020 | ..... | .968 | |
| 9794 | .....do | H | .350 | .560 | .287 | .045 | .024 | ..... | 1.278 | |
| 9795 | .....do | I | .308 | .561 | .230 | .040 | .021 | ..... | .927 | |
| 9796 | .....do | J | .363 | .215 | .047 | .050 | .030 | ..... | 2.000 | |
| 9797 | .....do | K | .332 | .610 | .235 | .050 | .018 | ..... | .350 | |

## *CHEMICAL ANALYSES OF BRONZE AND BRASS.*

| Marks. | Description. | Cu. | Sn. | Zn. | Fe. | Mn. | Remarks. |
|---|---|---|---|---|---|---|---|
| A 79 2 R S 6 | Recoil sleeve, 6-pounder mount | 90.00 | 8.88 | 1.12 | ..... | ..... | |
| 1 R C 5 | Guide sleeve, 6-pounder mount | 57.90 | 0.50 | 41.48 | ..... | ..... | |
| | Recoil cylinder, 6-pounder mount | 93.75 | 6.20 | ..... | ..... | ..... | |
| A 15 O S 6 | Oscillating slide, 6-pounder mount | 89.00 | 10.06 | 0.94 | ..... | ..... | |
| A 47 O S 6 | .....do | 60.10 | None. | 36.07 | 1.70 | 2.13 | |
| A 39 O S 6 | .....do | 90.64 | 8.32 | 1.04 | ..... | ..... | |
| A 23 2 O S 6 | .....do | 89.86 | 8.56 | 1.58 | ..... | ..... | |
| A 52 1 O S 6 | .....do | 89.00 | 9.80 | 1.20 | ..... | ..... | |
| A 52 2 O S 6 | .....do | 88.77 | 9.98 | 1.25 | ..... | ..... | |
| A 61 O S 6 | .....do | 60.02 | 0.37 | 35.98 | 1.75 | 1.88 | |
| A 62 O S 6 | .....do | 60.00 | None. | 35.15 | 1.65 | 3.20 | |
| A 63 O S 6 | .....do | 60.20 | None | 34.91 | 1.63 | 3.26 | |
| A 23 P Y 6 | Pivot yoke, 6-pounder mount | 89.56 | 10.44 | Trace. | ..... | ..... | |
| A 16 P Y 15 | Pivot yoke, 15-pounder mount | 88.00 | 10.21 | 1.89 | ..... | ..... | |
| A 62 R S 15 | Recoil sleeve, 15-pounder mount | 61.00 | Trace. | 35.93 | 1.48 | 1.59 | |
| A 65 R S 15 | .....do | 60.00 | None. | 37.20 | 1.60 | 2.20 | |
| A 66 R S 15 | .....do | 59.89 | None. | 37.51 | 1.57 | 2.53 | |
| A 51—R S 15 | .....do | 60.00 | None. | 34.70 | 1.65 | 3.65 | |
| | Counter recoil buffer, 10-inch disappearing carriage | 88.65 | 9.03 | 2.20 | ..... | ..... | |
| | Counter recoil buffer, 12-inch disappearing carriage | 67.84 | 0.66 | 31.50 | ..... | ..... | From Ordnance Office, Feb. 15, 1900. |
| | .....do | 65.34 | 0.69 | 33.97 | ..... | ..... | From North Point, carriage No. 24. |
| | .....do | 91.28 | 7.64 | 1.08 | ..... | ..... | Do. |
| No. 2 | Lyle life-saving gun | 90.79 | 9.21 | ..... | ..... | ..... | |
| | Pressure cylinders made in France | 72.65 | ..... | 26.51 | 0.84 | ..... | |

## *TESTS MADE FOR PRIVATE PARTIES DURING THE FISCAL YEAR ENDED JUNE 30, 1900.*

| Date. | Material. | For whom tested. | | |
|---|---|---|---|---|
| | | Name. | City. | State. |
| 1899. | | | | |
| July 1 | Iron pipe | Lamb & Ritchie | Cambridgeport | Mass. |
| 5 | Cement | J. P. O'Connell & Co | Dorchester | Mass. |
| | Manila rope | Durand Woodman | New York | N. Y. |
| 10 | Steel bars | The Marlin Fire Arms Co | New Haven | Conn. |
| 20 | Rail joints | Boston Elevated Rwy. Co | Boston | Mass. |
| 24 | Bicycle balls | Waltham Manufacturing Co | Waltham | Mass. |
| 29 | Copper wire | The American Bell Telephone Co | South Boston | Mass. |
| 31 | Trolley-wire clamp. | Dr. F. W. Webber | Newton | Mass. |
| Aug. 4 | Hardened steel bars. | Harvey Steel Co | Newark | N. J. |
| 8 | Shackles | G. M. Stanwood & Co | Portland | Me. |
| 9 | Brass pipe | American Tube Works | Boston | Mass. |
| | Felt cloth | American Felt Co | ....do | Mass. |
| | Leather belting | H. F. Moody | South Weymouth | Mass. |
| | Rock maple wood. | Wason Manufacturing Co | Brightwood | Mass. |
| 16 | "Semisteel" | Walworth Manufacturing Co | Boston | Mass. |
| | Half bricks | Norcross Bros | ....do | Mass. |
| 25 | Cotton cloth | Hood Rubber Co | Watertown | Mass. |
| 26 | Wire rope | The Lincoln-Dillaway Co | Boston | Mass. |
| 31 | Steel bar | Savage Arms Co | Utica | N. Y. |
| Sept. 1 | Mortar and concrete. | Norcross Bros | Boston | Mass. |
| 6 | Shackles | G. M. Stanwood & Co | Portland | Me. |
| 8 | Old stay bolts | Mexican Central Rwy. Co | Boston | Mass. |
| | Cotton sheeting | Hood Rubber Co | Watertown | Mass. |
| 12 | ....do | ....do | ....do | Mass. |
| | Marble | Pennsylvania Marble and Granite Co. | Westgrove | Pa. |
| 14 | Bronze sheave | Herbert Loud Block Co | Boston | Mass. |
| 15 | Brass pipe | American Tube Works | ....do | Mass. |
| 20 | Steel bar | Savage Arms Co | Utica | N. Y. |
| 22 | Copper cylinders | Union Metallic Cartridge Co | Bridgeport | Conn. |
| 25 | Steel plate | Schenectady Locomotive Works | Schenectady | N. Y. |
| | Old boiler plate | Citizens' Electric Light and Power Co. | Houston | Tex. |
| 30 | Cotton duck | Fearing, Whiton & Co | Boston | Mass. |
| Oct. 9 | Chain | Panama R. R. Co | New York | N. Y. |
| 11 | Bicycle tires | Yatman Rubber Co | Newark | N. J. |
| Nov. 2 | Steel bar | The Marlin Fire Arms Co | New Haven | Conn. |
| | Turn-buckle | Carson Trench Machine Co | Boston | Mass. |
| | Bicycle balls | Waltham Manufacturing Co | Waltham | Mass. |
| | Half bricks | D. J. Curtis & Son | Springfield | Mass. |
| 7 | Steel bar | Savage Arms Co | Utica | N. Y. |
| | ....do | Remington Arms Co | Ilion | N. Y. |
| 9 | Valves | Eynon & Evans Manufacturing Co | Boston | Mass. |
| 17 | Manila rope | Durand Woodman | New York | N. Y. |
| 20 | Bicycle balls | Waltham Manufacturing Co | Waltham | Mass. |
| 21 | Bricks | Norcross Bros | Boston | Mass. |
| 24 | Blocks | Boston and Lockport Block Co | ....do | Mass. |
| | Soft steel | American Ordnance Co | Lynn | Mass. |
| 28 | Steel bar | Savage Arms Co | Utica | N. Y. |
| Dec. 5 | Cast-iron pipes | Bar Harbor Water Co | Bar Harbor | Me. |
| | Half bricks | Norcross Bros | Boston | Mass. |
| 20 | Steel bar | Savage Arms Co | Utica | N. Y. |
| 1900. | | | | |
| Jan. 5 | Steel bars | The Marlin Fire Arms Co | New Haven | Conn. |
| 6 | Hollow tile | The H. B. Camp Co | Akron | Ohio. |
| 11 | Bicycle balls | Waltham Manufacturing Co | Waltham | Mass. |
| 13 | Corrugated-iron flooring. | The Cambridge Manufacturing Co | New York | N. Y. |
| 16 | Bicycle balls | Waltham Manufacturing Co | Waltham | Mass. |
| 17 | Rubber tires | American Rubber Tire Co | Boston | Mass. |
| 23 | Cotton rope | Arthur A. Brigham | ....do | Mass. |
| 25 | Steel bar | Savage Arms Co | Utica | N. Y. |
| | Leather belting | Standard Rope and Twine Co | Boston | Mass. |
| 30 | Steel plate | Schenectady Locomotive Works | Schenectady | N. Y. |
| Feb. 20 | Manila rope | J. H. Smith | Boston | Mass. |
| | Wrought-iron bars | Bradlee & Co | Philadelphia | Pa. |
| | Steel plate | Schenectady Locomotive Works | Schenectady | N. Y. |
| 27 | Steel bar | Savage Arms Co | Utica | N. Y. |
| 28 | Copper cylinders. | Union Metallic Cartridge Co | Bridgeport | Conn. |
| Mar. 12 | Malleable cast iron. | E. M. Shaw | Providence | R. I. |
| 16 | Steel bars | The Marlin Fire Arms Co | New Haven | Conn. |



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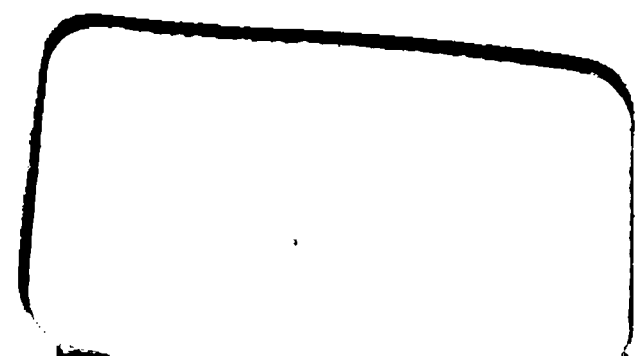
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